PICO121

AMD G-Series Embedded SoC
Pico-ITX Board

User's Manual

Disclaimers

This manual has been carefully checked and believed to contain accurate information. Axiomtek Co., Ltd. assumes no responsibility for any infringements of patents or any third party's rights, and any liability arising from such use.

Axiomtek does not warrant or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information in this document. Axiomtek does not make any commitment to update the information in this manual.

Axiomtek reserves the right to change or revise this document and/or product at any time without notice.

No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Axiomtek Co., Ltd.

CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

©Copyright 2014 Axiomtek Co., Ltd.

All Rights Reserved

April 2014, Version A1

Printed in Taiwan

ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

Trademarks Acknowledgments

Axiomtek is a trademark of Axiomtek Co., Ltd.

Windows® is a trademark of Microsoft Corporation.

AMI is trademark of American Megatrend Inc.

IBM, PC/AT, PS/2, VGA are trademarks of International Business Machines Corporation.

AMD is trademark of AMD Corporation, Inc.

Other brand names and trademarks are the properties and registered brands of their respective owners.

Table of Contents

Disclaimers ii
ESD Precautions iii

Chapter 1 Introduction 1

1.1 Features 2
1.2 Specifications 2
1.3 Utilities Supported 3

Chapter 2 Board and Pin Assignments 5

2.1 Board Dimensions and Fixing Holes 5
2.2 Board Layout 7
2.3 Assembly Drawing 9
2.4 Jumper Settings 12
2.4.1 LVDS +12V Voltage Selection (JP1) (Optional) 13
2.4.2 Auto Power On (JP2) 13
2.4.3 LVDS +3.3V/+5V Voltage Selection (JP3) 13
2.4.4 LVDS Brightness Control Mode Setting (JP4) 13
2.4.5 DDR3/3L Voltage Selection (JP5) 14
2.4.6 RCC Enable (JP6) 14
2.4.7 Restore BIOS Optimal Defaults (JP7) 14
2.4.8 Buzzer Selection (CN1) 14
2.5 Connectors 15
2.5.1 Power LED Header (CN3) 16
2.5.2 High and Low Speed Board to Board Connectors (CN4 and CN5) 16
2.5.3 SMBus Connector (CN6) 18
2.5.4 Fan Power Connector (CN7) 18
2.5.5 LVDS Connector (CN8) 18
2.5.6 Serial ATA Power Connector (CN9) 20
2.5.7 Inverter Connector (CN10) 20
2.5.8 SWIM Connector (CN11) 20
2.5.9 DC Power In Connector (CN12) 20
2.5.10 VGA Connector (CN13) 21
2.5.11 Ethernet Connector (LAN1) 21
2.5.12 Serial ATA Connector (SATA1) 22
2.5.13 CMOS Battery Connector (BAT1) 22
2.5.14 Full-size PCI-Express Mini Card and mSATA Connector (SCN1) 23
2.5.15 SIM Card Slot (SCN2) 24
2.5.16 Half-size PCI-Express Mini Card Connector (SCN3) 24

Chapter 3 AX93277 I/O Board 25
3.1 AX93277 Specifications 25
3.2 AX93277 Dimensions and Fixing Holes 25
3.3 AX93277 Board Layout 27
3.4 AX93277 Jumper Settings 28
3.4.1 COM1 Data/Power Selection (JP1 and JP2) 28
3.5 AX93277 Connectors, Switches and LED 29
3.5.1 High and Low Speed Board to Board Connectors (CN2 and CN10) 29
3.5.2 System Power Switch (CN5) 31
3.5.3 COM Connector (CN6) 31
3.5.4 Audio Jack (CN8) 31
3.5.5 System Reset Switch (CN9) 32
3.5.6 USB 2.0 Connectors (USB1 and USB2) 32
3.5.7 Power and HDD LED Indicator (D1) 32
Chapter 4 AX93267 I/O Board 33
4.1 AX93267 Specifications 33
4.2 AX93267 Dimensions and Fixing Holes 34
4.3 AX93267 Board Layout 35
4.4 AX93267 Connectors 36
4.4.1 DC Power Jack (CN1) 36
4.4.2 DC Power In Connector (CN2) 36
4.4.3 VGA Connector (CN3) 37
4.4.4 D-Sub VGA Connector (CN4) 37
4.4.5 Ethernet Connector (CN5) 38
4.4.6 RJ-45 Ethernet Port (CN6) 38
Chapter 5 Hardware Description 39
5.1 Microprocessors 39
5.2 BIOS 39
5.3 System Memory 39
5.4 I/O Port Address Map 40
5.5 Interrupt Controller (IRQ) Map 42
5.6 Memory Map 45
Chapter 6 AMI BIOS Setup Utility 47
6.1 Starting 47
6.2 Navigation Keys 47
6.3 Main Menu 49
6.4 Advanced Menu 50

6.5 Chipset Menu 60
6.6 Boot Menu 64
6.7 Security Menu 65
6.8 Save & Exit Menu 66

Chapter 7 Drivers Installation 69

7.1 Installing Chipset Driver 69
7.2 Installing Ethernet Driver 75
7.3 Installing Audio Driver 78

Chapter 8 DASH User Guide 81

8.1 Client Side 81
8.1.1 BIOS Settings 81
8.1.2 Software Installation 85
8.2 Console Side 85
8.2.1 Management Console Tool 85
8.2.2 Built-in Web Server 90

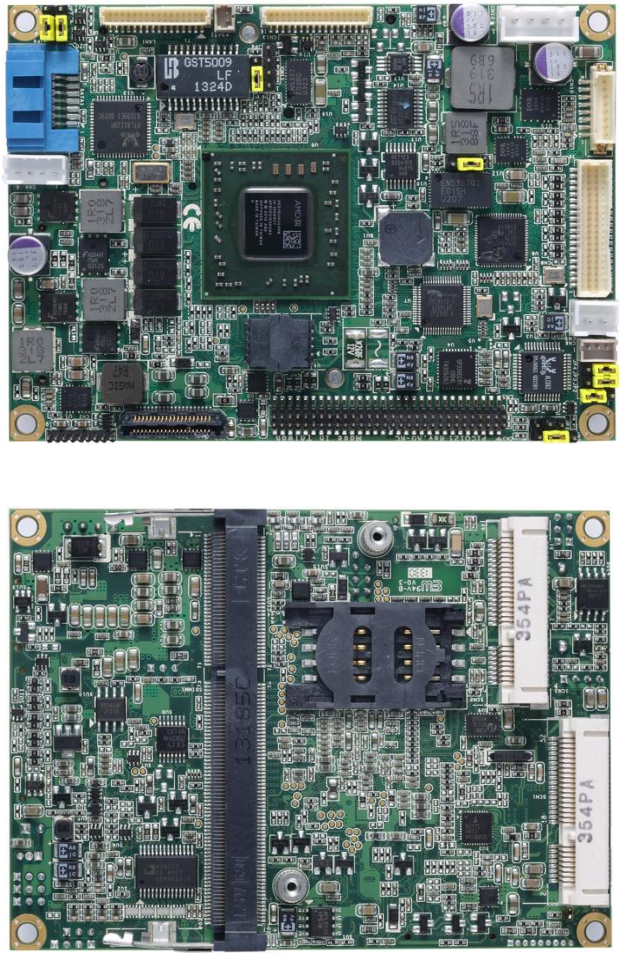
Appendix A AX93278 I/O Board (Optional) 91

A.1 AX93278 Specifications 91
A.2 AX93278 Dimensions and Fixing Holes 91
A.3 AX93278 Board Layout 93
A.4 AX93278 Assembly Drawing 94
A.5 AX93278 Jumper Settings 95
A.5.1 COM1 Data/Power Selection (JP1 and JP2) 95
A.6 AX93278 Connectors, Switches and LED 96
A.6.1 High and Low Speed Board to Board Connectors (CN2 and CN1) 96
A.6.2 Ethernet and USB 2.0 Connector (CN3) 98
A.6.3 System Power Switch (CN4) 98
A.6.4 USB 3.0 Connector (CN5) 99
A.6.5 COM Connector (CN6) 99
A.6.6 HDMI Connector (CN7) 100
A.6.7 System Reset Switch (CN8) 100
A.6.8 Audio Connector (AUDIO1) 100
A.6.9 Power and HDD LED Indicator (D1) 100

Appendix B Watchdog Timer 101

B.1 About Watchdog Timer 101
B.2 How to Use Watchdog Timer 101
B.3 Sample Program 102

Chapter 1
Introduction



The PICO121 is a Pico-ITX board with AMD G-Series Embedded SoC GX-210HA and GX-210JA that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

The board has one 204-pin unbuffered SO-DIMM socket for DDR3/3L1333/1066MHz SO-DIMM memory, maximum memory capacity up to 8GB. It also features one Gigabit/Fast Ethernet, one SATA port with transfer rates up to 6Gb/s, four USB 2.0 high speed compliant, and built-in high definition audio codec that can achieve the best stability and reliability for industrial applications. Moreover, it has one full-size PCI-Express Mini Card and one half-size PCI-Express Mini Card which provide good expansions for network connecting. Additionally, it provides you with unique embedded features, such as two serial ports (one RS-232/422/485 and one RS-232) and Pico-ITX form factor that applies an extensive array of PC peripherals. The board can be enhanced by its built-in watchdog timer function, a special industrial feature not commonly seen on other motherboards.

1.1 Features

- AMD G-Series embedded SoC GX-210HA and GX-210JA
- 1 DDR3/3L SO-DIMM supports up to 8GB memory capacity
- 4 USB 2.0 ports
- 2 COM ports
- 1 full-size PCI-Express Mini Card
- 1 half-size PCI-Express Mini Card
- DASH (Desktop and mobile Architecture for System Hardware) support
- +12V only DC-in supported

1.2 Specifications

- **CPU**
  - AMD G-Series embedded SoC dual core GX-210HA 1.0GHz.
  - AMD G-Series embedded SoC dual core GX-210JA 1.0GHz

- **Thermal Solution**
  - Passive but with reserved fan connector.

- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 16Mbit SPI Flash, DMI, Plug and Play.
  - RPL/PXE Ethernet Boot ROM.

- **System Memory**
  - One 204-pin unbuffered DDR3/3L SO-DIMM socket.
  - Maximum up to 8GB DDR3/3L 1333/1066MHz memory.

- **Onboard Multi I/O**
  - Controller: Fintek F81801U.
  - Serial Ports: One port for RS-232/422/485 and one port for RS-232 in pin headers.

- **Serial ATA**
  - One SATA-600 connector.

- **Expansion**
  - One full-size PCI-Express Mini Card.
  - One half-size PCI-Express Mini Card.
  - One board-to-board connector, including two USB 3.0, one PCI Expressx1 and one DisplayPort.

- **USB Interface**
  - Four USB ports with fuse protection and comply with USB Spec. Rev. 2.0 in pin headers.

- **Display**
  - One 16-pin VGA wafer connector.
  - One 2x20-pin connector for 18-bit/24-bit single/dual channel LVDS and one 8-pin wafer connector for inverter control. LVDS resolution is up to 1920x1200.

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

- **Ethernet**
  - One 16-pin wafer connector.
  - One port with Realtek RTL8111DP for Gigabit/Fast Ethernet.

- **Audio**
  - HD audio compliant with Realtek ALC662.
  - MIC-in and line-out in pin headers.

- **Power Input**
  - One 1x4-pin wafer connector.
  - +12V only DC-in.
  - AT auto power on function supported.

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
  - Pico-ITX form factor.

Note

All specifications and images are subject to change without notice.

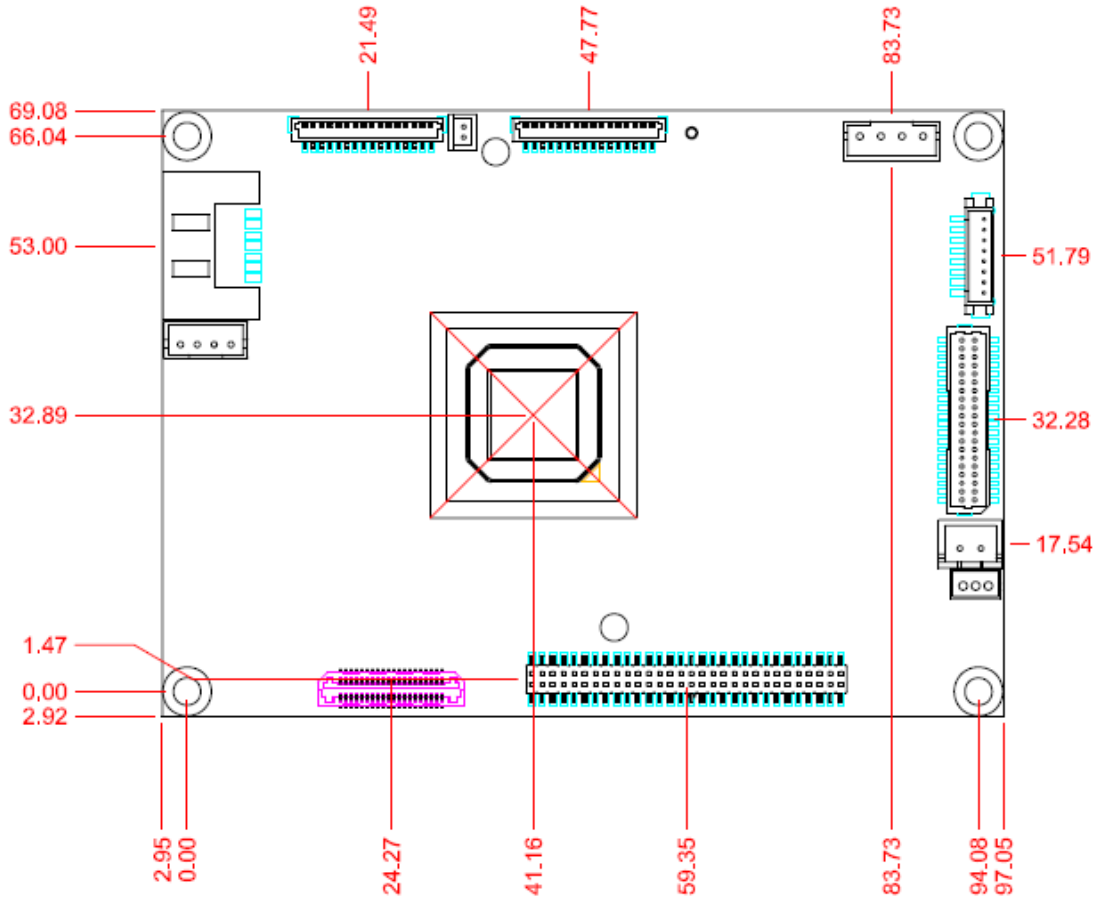
1.3 Utilities Supported

- Chipset and graphics driver
- Ethernet driver (RTL8111DP)
- Audio driver
- Realtek Management Console Tool

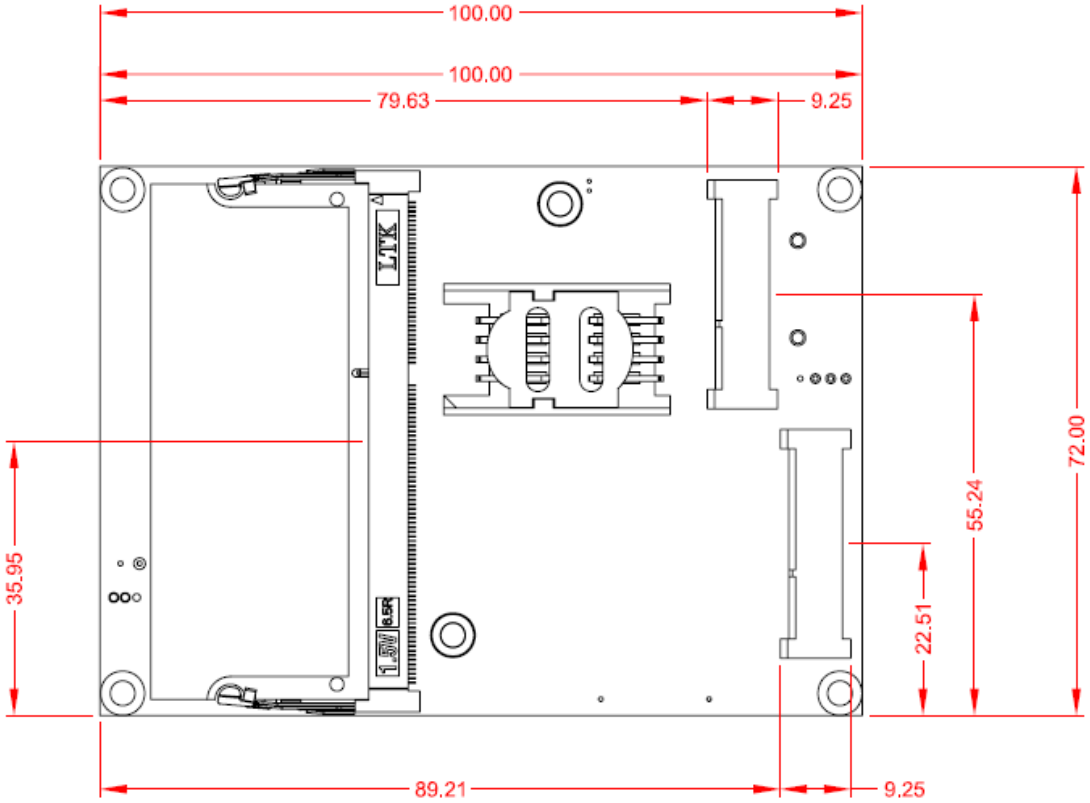
This page is intentionally left blank.

Chapter 2
Board and Pin Assignments

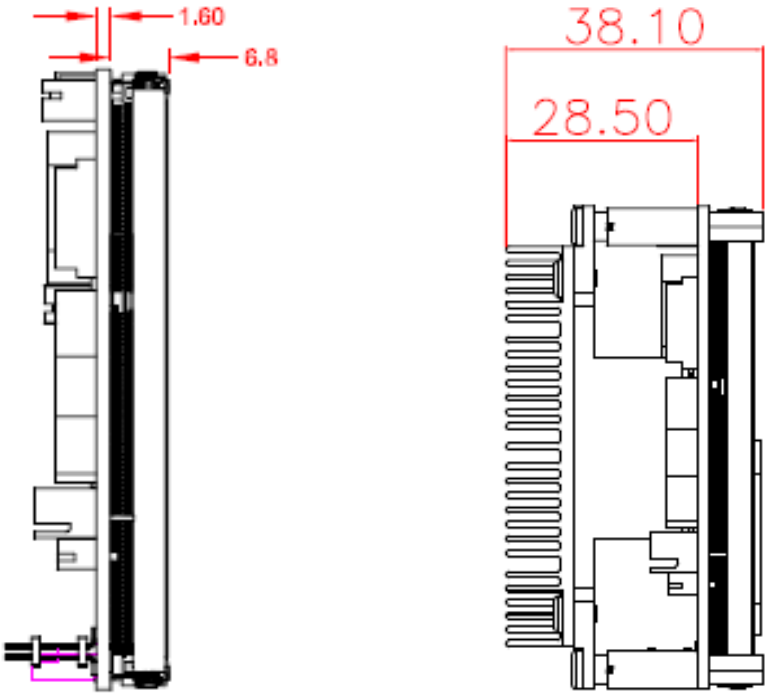
2.1 Board Dimensions and Fixing Holes



Top View

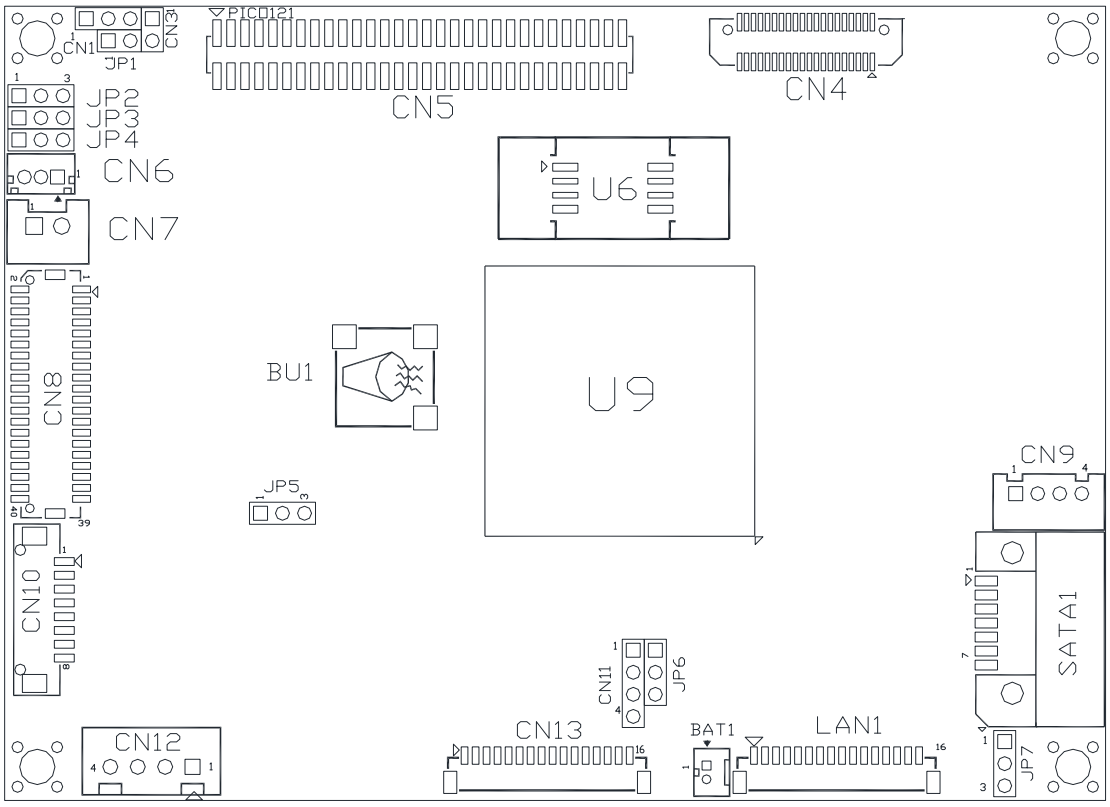


Bottom View

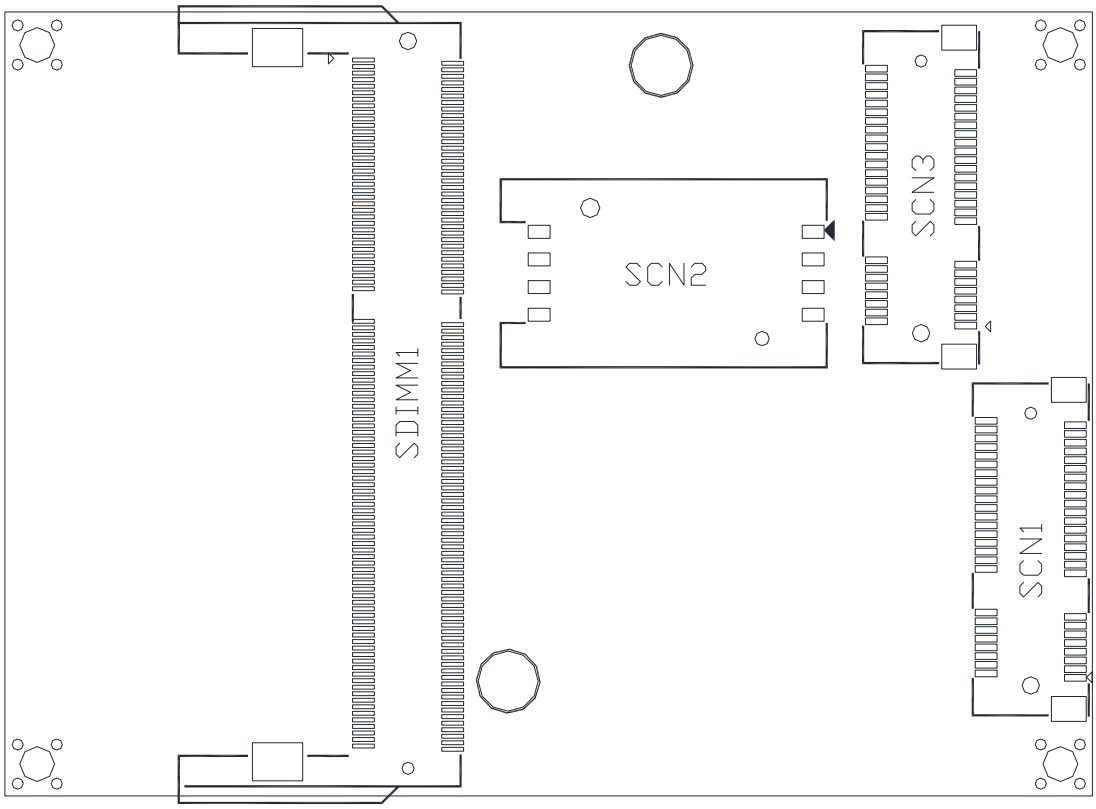


Side View

2.2 Board Layout



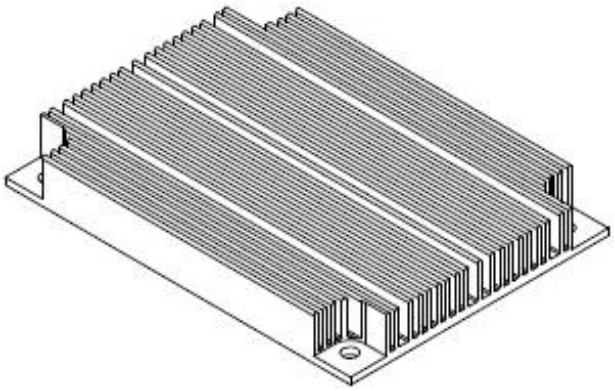
Top View



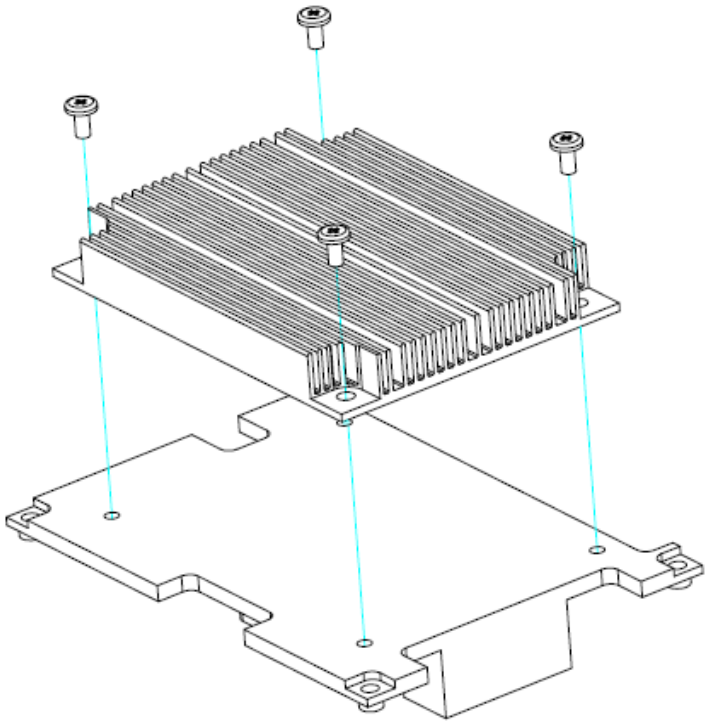
Bottom View

2.3 Assembly Drawing

Heatsink for PICO121 (see image below):



First of all, screw heatsink into heatspreader.



x4

For thermal dissipation, a heatspreader enables the PICO121's components to dissipate heat efficiently. Images below illustrate how to install the heatspreader.

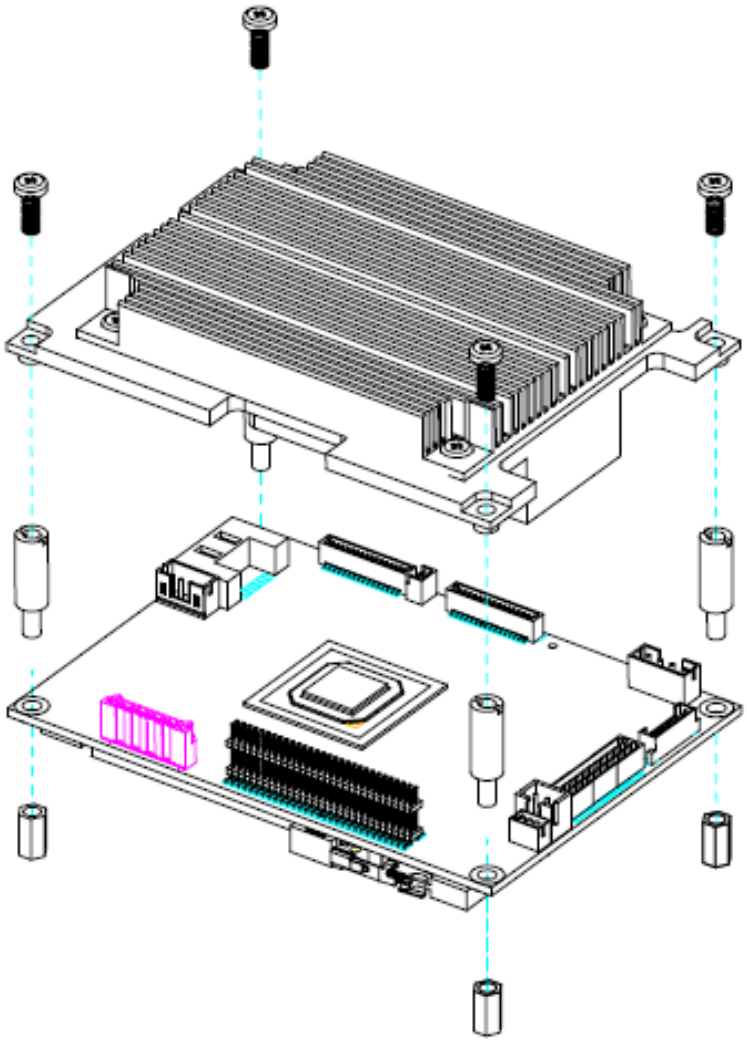
Installing Heatspreader

The PICO121 has four assembly holes for installing heatspreader plate. Align and firmly secure heatspreader plate to PICO121. Be careful not to over-tighten the screws.

x4

x4

x4 (8mm)



Installing Heatspreader and I/O Boards

Gently connect AX93277 and AX93267 I/O boards to PICO121. Align assembly holes and firmly secure the heatspreader plate and I/O boards to the PICO121, see image below. Be careful not to over-tighten the screws. See chapter 3 and chapter 4 for details of AX93277 and AX93267 I/O boards, respectively.

x4

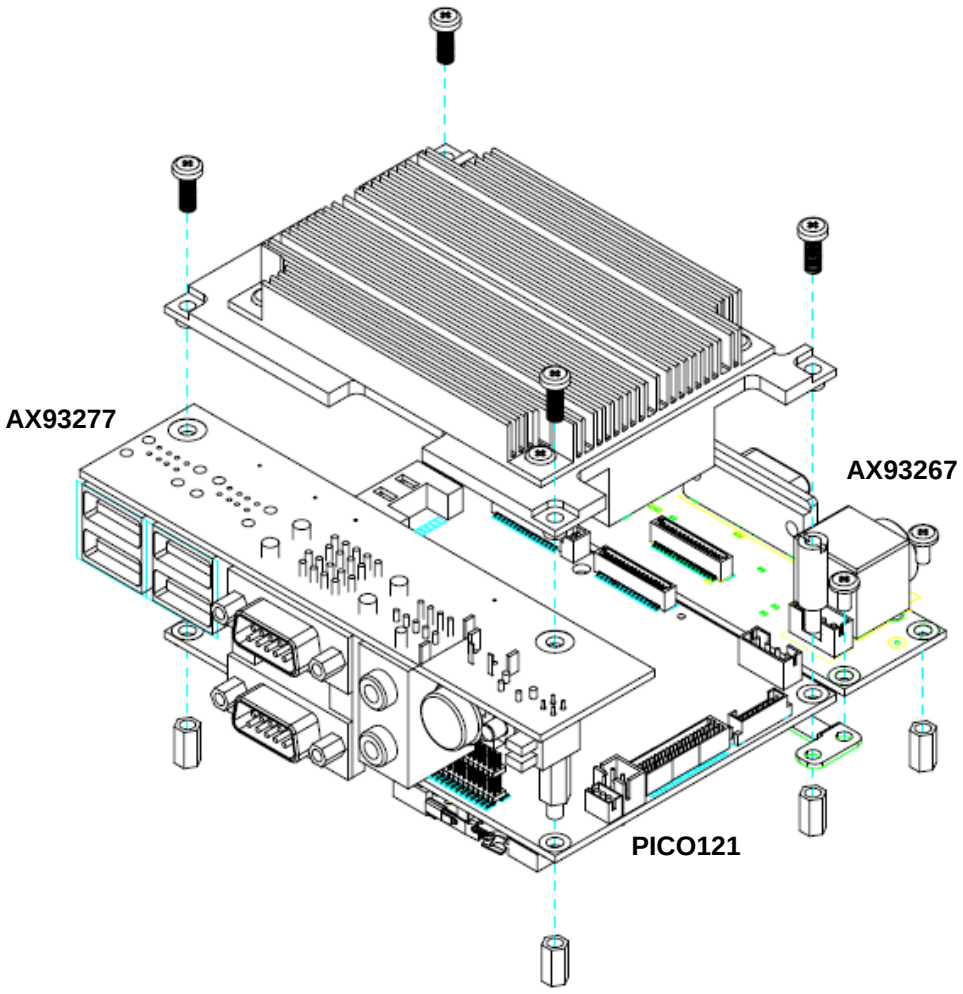
x2

x2

x4 (8mm)

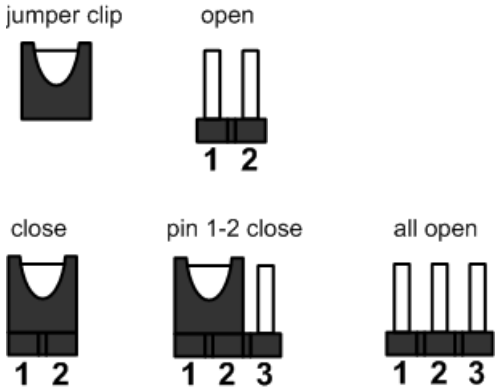
x2 (7mm)

x4



2.4 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumper settings on the PICO121 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note

Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description	Setting
JP1 (Optional)	LVDS +12V Voltage Selection Default: NA	Open
JP2	Auto Power On Default: Disable	1-2 Close
JP3	LVDS +3.3V/+5V Voltage Selection Default: +3.3V	1-2 Close
JP4	LVDS Brightness Control Mode Setting Default: PWM Mode	1-2 Close
JP5	DDR3/3L Voltage Selection Default: +1.5V	1-2 Close
JP6	RCC Enable Default: Enable	1-2 Close
JP7	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close
CN1	Buzzer Selection Default: Internal Buzzer	2-3 Close

2.4.1 LVDS +12V Voltage Selection (JP1) (Optional)

The board supports voltage selection for flat panel displays. Use JP1 to set LVDS connector (CN8) pin 1~6 VCCM to +12V. To prevent hardware damage, before connecting please make sure that the input voltage of flat panel is correct.

Function	Setting
+12V	Close
NA (Default)	Open

2.4.2 Auto Power On (JP2)

If this jumper is enabled for AC power input, the system will be automatically power on without pressing soft power button. If this jumper is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	1-2 close
Enable auto power on	2-3 close

Note

This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.

2.4.3 LVDS +3.3V/+5V Voltage Selection (JP3)

The board supports voltage selection for flat panel displays. Use JP3 to set LVDS connector (CN8) pin 1~6 VCCM to +3.3V or +5V. To prevent hardware damage, before connecting please make sure that the input voltage of flat panel is correct.

Function	Setting
+3.3V (Default)	1-2 close
+5V	2-3 close

2.4.4 LVDS Brightness Control Mode Setting (JP4)

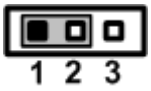
This jumper enables you to select PWM or voltage control mode for inverter connector (CN10). These two control modes are for adjusting the brightness of LVDS panel.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	2-3 close

2.4.5 DDR3/3L Voltage Selection (JP5)

This jumper is for DDR3/3L voltage selection. The +1.35V is for DDR3 low voltage module (DDR3L).

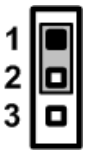
Function	Setting
+1.5V (Default)	1-2 close
+1.35V	2-3 close



2.4.6 RCC Enable (JP6)

RCC is a Remote Control Controller for DASH function. Use this jumper for updating RCC firmware via SWIM interface, see section 2.5.8 for CN11.

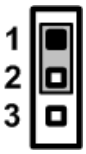
Function	Setting
Enable (Default)	1-2 close
Disable	2-3 close



2.4.7 Restore BIOS Optimal Defaults (JP7)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



2.4.8 Buzzer Selection (CN1)

Select external or internal buzzer.

Function	Setting
External buzzer	1-2 close
Internal buzzer (Default)	2-3 close

2.5 Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table showing connectors on the hardware.

Connector	Description
CN3	Power LED Header
CN4	High Speed Board to Board Connector
CN5	Low Speed Board to Board Connector
CN6	SMBus Connector
CN7	Fan Power Connector
CN8	LVDS Connector
CN9	Serial ATA Power Connector
CN10	Inverter Connector
CN11	SWIM Connector
CN12	DC Power In Connector
CN13	VGA Connector
LAN1	Ethernet Connector
SATA1	Serial ATA Connector
BAT1	CMOS Battery Connector
SCN1	Full-size PCI-Express Mini Card and mSATA Connector
SCN2	SIM Card Slot
SCN3	Half-size PCI-Express Mini Card Connector
SDIMM1	DDR3/3L SO-DIMM Connector

2.5.1 Power LED Header (CN3)

This header is for power LED interface.

Pin	Signal
1	+5V
2	GND

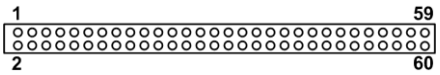
2.5.2 High and Low Speed Board to Board Connectors (CN4 and CN5)

CN4 is a 2x20-pin high speed board to board connector. The pin assignments of CN4 are given as follows.

Pin	Signal	Pin	Signal
1	USB3_TX0_DP	2	DP0_HPD
3	USB3_TX0_DN	4	DP0_AUX_P
5	GND	6	DP0_AUX_N
7	USB3_RX0_DP	8	GND
9	USB3_RX0_DN	10	DP0_TX3_P
11	GND	12	DP0_TX3_N
13	USB3_TX1_DP	14	GND
15	USB3_TX1_DN	16	DP0_TX2_P
17	GND	18	DP0_TX2_N
19	USB3_RX1_DP	20	+5V
21	USB3_RX1_DN	22	DP0_TX1_P
23	GND	24	DP0_TX1_N
25	N/A	26	GND
27	PCIE_TXP2	28	DP0_TX0_P
29	PCIE_TXN2	30	DP0_TX0_N
31	GND	32	GND
33	PCIE_RXP2	34	PCIE_LAN1_CLK_P
35	PCIE_RXN2	36	PCIE_LAN1_CLK_N
37	GND	38	GND
39	PCIE_RST#	40	PCIE_WAKE_UP#

CN5 is a 2x30-pin low speed board to board connector. The pin assignments of CN5 are given as follows.

Pin	Signal	Pin	Signal
1	MIC_IN	2	LINE_O_L
3	LINE_IN_L	4	LINE_O_R
5	LINE_IN_R	6	AUDIO_GND
7	AUDIO_GND	8	+5V
9	COMGND	10	+5V
11	DCD1	12	DSR1
13	RXD1	14	RTS1
15	TXD1	16	CTS1
17	DTR1	18	RI1
19	COMGND	20	+5V
21	DCD2	22	DSR2
23	RXD2	24	RTS2
25	TXD2	26	CTS2
27	DTR2	28	RI2
29	GND	30	GND
31	USB_PWR0	32	USB_PWR0
33	C_USB_PN6	34	C_USB_PN7
35	C_USB_PP6	36	C_USB_PP7
37	USB0_GND	38	USB0_GND
39	USB_PWR1	40	USB_PWR1
41	C_USB_PN8	42	C_USB_PN9
43	C_USB_PP8	44	C_USB_PP9
45	USB1_GND	46	USB1_GND
47	+3.3V	48	GND
49	+3.3V	50	GND
51	+3.3V_DUAL	52	FP_PSIN_N
53	+3.3V_DUAL	54	GND
55	HW_RESET_N	56	+5V
57	HDD_ACT#	58	+12V
59	GND	60	+12V



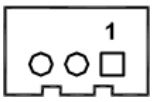
Note

It is suggested to insert I/O board (AX93277 or AX93278) into CN4 and CN5 on PICO121 (see Chapter 3/Appendix A for details of I/O board).

2.5.3 SMBus Connector (CN6)

This connector is for SMBus interface. The SMBus (System Management Bus) is a simple 2-wire bus for the purpose of lightweight communication.

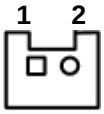
Pin	Signal
1	SMBus clock
2	SMBus data
3	GND



2.5.4 Fan Power Connector (CN7)

This is a 2.5mm pitch wafer connector for fan power interface.

Pin	Signal
1	+5V
2	GND

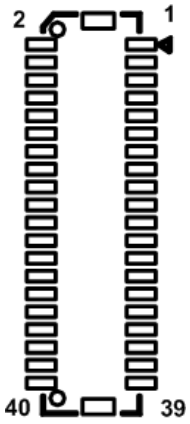


2.5.5 LVDS Connector (CN8)

This board has a 40-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B 40-pin connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP3 or JP1 (see section 2.4.3 or 2.4.1).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	Channel B D0-
13	N.C	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

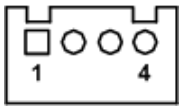
24-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.5.6 Serial ATA Power Connector (CN9)

This is a 2.0mm pitch wafer connector for Serial ATA (SATA) power interface.

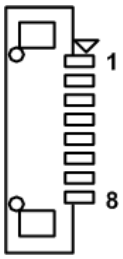
Pin	Signal
1	+12V
2	GND
3	GND
4	+5V



2.5.7 Inverter Connector (CN10)

This is a DF13-8S-1.25C 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

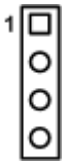
Pin	Signal
1	+12V
2	+12V
3	+5V
4	BL_ENABLE
5	GND
6	GND
7	GND
8	BR_CTRL



2.5.8 SWIM Connector (CN11)

This is a 2.0mm pitch pin header for updating RCC firmware.

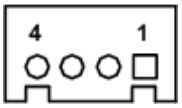
Pin	Signal
1	+3.3V
2	SWIM
3	SWIM_RST
4	GND



2.5.9 DC Power In Connector (CN12)

This is a 1x4-pin wafer connector for DC +12V input.

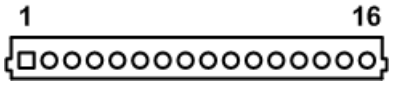
Pin	Signal
1	+12V
2	+12V
3	GND
4	GND



2.5.10 VGA Connector (CN13)

This is a 16-pin wafer connector for VGA interface.

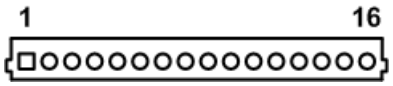
Pin	Signal
1	RSVD
2	RED
3	GND
4	GREEN
5	GND
6	BLUE
7	GND
8	VCC
9	DDC_DATA
10	GND
11	GND
12	HSYNC
13	GND
14	VSYNC
15	DDC_CLK
16	GND



2.5.11 Ethernet Connector (LAN1)

This is a 16-pin wafer connector for Ethernet interface.

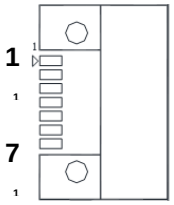
Pin	Signal
1	1000 LAN LED
2	100 LAN LED
3	GND
4	MDI3-
5	MDI3+
6	MDI1-
7	MDI2-
8	MDI2+
9	MDI1+
10	MDI0-
11	MDI0+
12	GND
13	LAN_VDD33
14	LAN_LINK_ACT
15	GND
16	GND



2.5.12 Serial ATA Connector (SATA1)

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for high-speed SATA interface port. It is a computer bus interface for connecting to devices such as hard disk drives.

Pin	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



2.5.13 CMOS Battery Connector (BAT1)

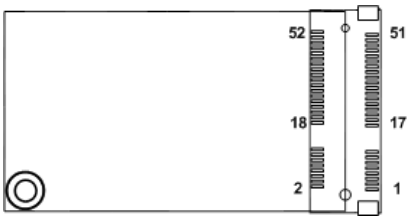
This connector is for CMOS battery interface.

Pin	Signal
1	+3.3V
2	GND

2.5.14 Full-size PCI-Express Mini Card and mSATA Connector (SCN1)

The SCN1 features full-size PCI-Express Mini Card with mSATA support. It supports the PCI-Express Mini Cards which are applied to either PCI-Express x1 or USB. It also complies with PCI-Express Mini Card Spec. V1.2. You are allowed to select PCI-Express Mini Card or mSATA support via BIOS setting (see section 6.4).

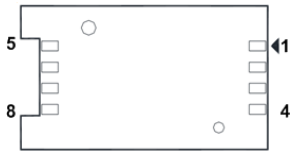
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	RSVD1	4	GND
5	RSVD2	6	+1.5V
7	CLKREQ#	8	SIM_PWR
9	GND	10	SIM_I/O
11	REFCLK-	12	SIM_CLK
13	REFCLK+	14	SIM_RST
15	GND	16	SIM_VCC
17	RSVD3	18	GND
19	RSVD4	20	RSVD9
21	GND	22	PERST#
23	PE_RXN0/ SATA_RXP1	24	+3.3VSB
25	PE_RXP0/ SATA_RXN1	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN0/ SATA_TXN1	32	SMB_DATA
33	PE_TXP0/ SATA_TXP1	34	GND
35	GND	36	USB_D4-
37	GND	38	USB_D4+
39	+3.3VSB	40	GND
41	+3.3VSB	42	RSVD
43	GND	44	RSVD
45	RSVD5	46	RSVD
47	RSVD6	48	+1.5V
49	RSVD7	50	GND
51	RSVD8	52	+3.3VSB



2.5.15 SIM Card Slot (SCN2)

The SCN2 is for inserting SIM Card. It is mainly used in 3G wireless network application. In order to work properly, the SIM Card must be used together with 3G module which is inserted to SCN1 or SCN3.

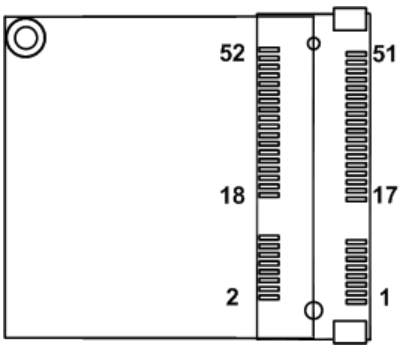
Pin	Signal
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC



2.5.16 Half-size PCI-Express Mini Card Connector (SCN3)

The SCN3 is a half-size PCI-Express Mini Card connector. It supports the PCI-Express Mini Cards which are applied to either PCI-Express x1 or USB. It complies with PCI-Express Mini Card Spec. V1.2.

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	RSVD1	4	GND
5	RSVD2	6	+1.5V
7	CLKREQ#	8	SIM_PWR
9	GND	10	SIM_I/O
11	REFCLK-	12	SIM_CLK
13	REFCLK+	14	SIM_RST
15	GND	16	SIM_VCC
17	RSVD3	18	GND
19	RSVD4	20	RSVD9
21	GND	22	PERST#
23	PE_RXN1	24	+3.3VSB
25	PE_RXP1	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN1	32	SMB_DATA
33	PE_TXP1	34	GND
35	GND	36	USB_D5-
37	GND	38	USB_D5+
39	+3.3VSB	40	GND
41	+3.3VSB	42	RSVD
43	GND	44	RSVD
45	RSVD5	46	RSVD
47	RSVD6	48	+1.5V
49	RSVD7	50	GND
51	RSVD8	52	+3.3VSB



Chapter 3
AX93277 I/O Board

The AX93277 is an I/O expansion board which is suggested to insert carefully into CN4 and CN5 on PICO121. Its specifications and detailed information are given in this chapter.

3.1 AX93277 Specifications

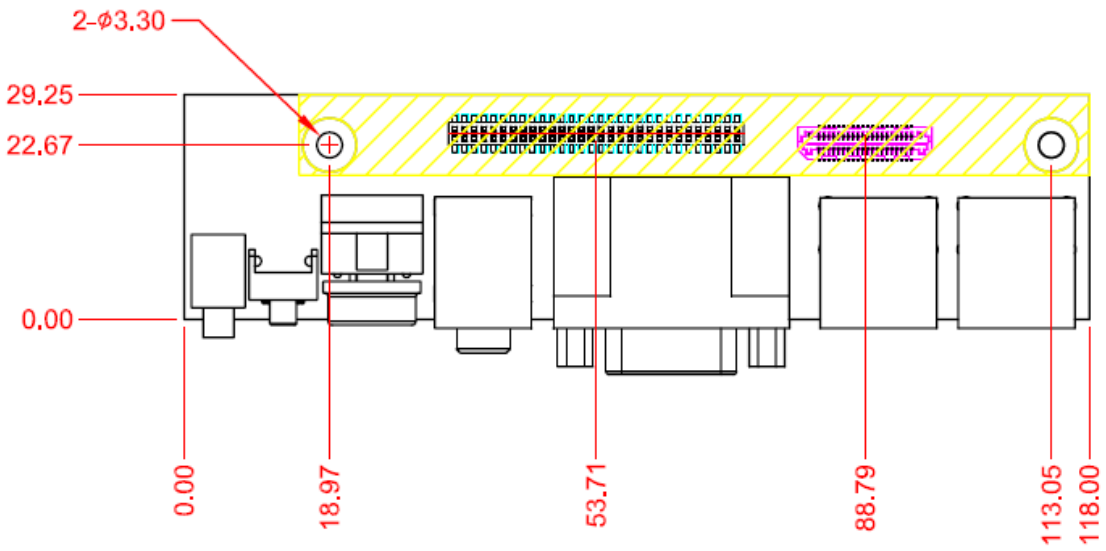
- **Size**
  - 118mm x 29mm

- **Features**
  - Support audio jack (MIC-in/line-out).
  - Four USB 2.0.
  - Serial Ports: One port for RS-232/422/485 and one port for RS-232.
  - Power-on, reset and red/green LED.

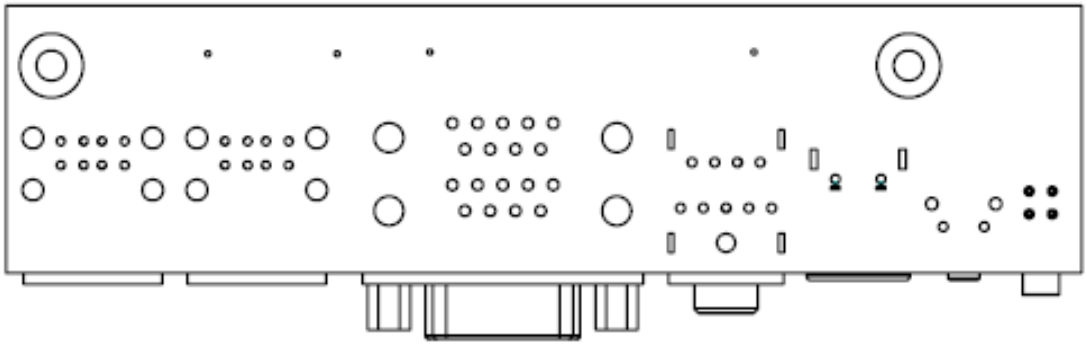
Note

All specifications and images are subject to change without notice.

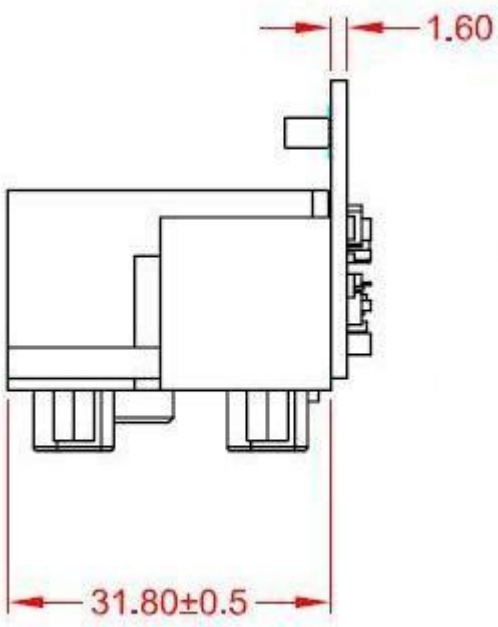
3.2 AX93277 Dimensions and Fixing Holes



Top View

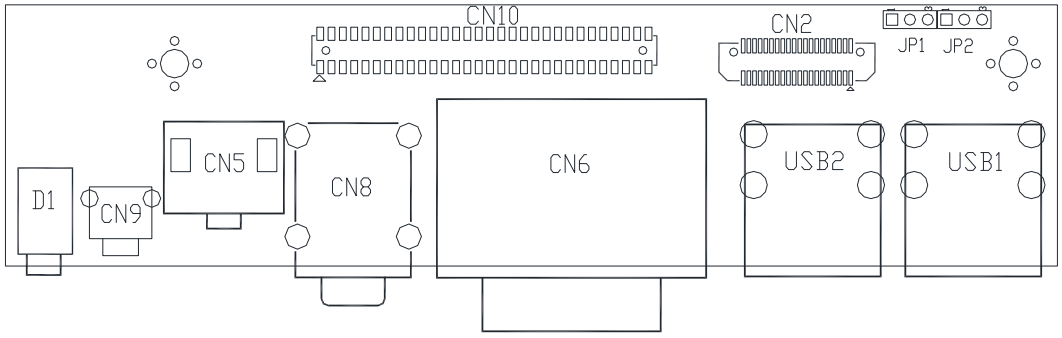


Bottom View

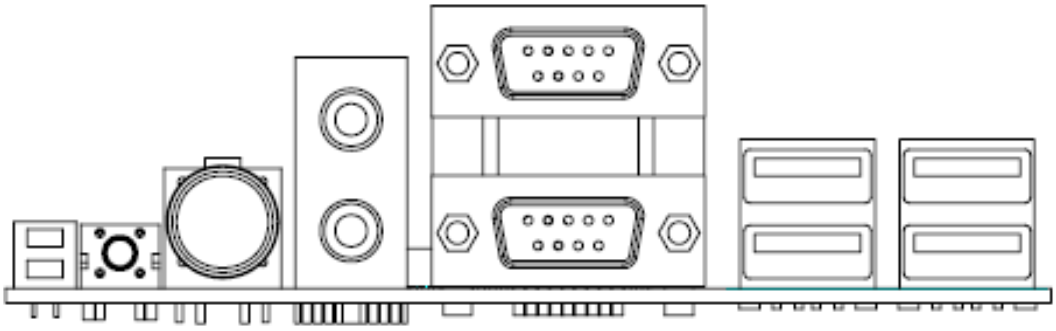


Side View

3.3 AX93277 Board Layout



Top View



Side View

3.4 AX93277 Jumper Settings

Properly configure jumper settings on the AX93277 I/O board to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note

Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP1	COM1 Data/+12V Power Selection Default: RS-232 Data	CN6 Pin 18: RI	1-2 Close
JP2	COM1 Data/+5V Power Selection Default: RS-232 Data	CN6 Pin 10: DCD	1-2 Close

3.4.1 COM1 Data/Power Selection (JP1 and JP2)

The COM1 port has +12V level power capability on RI and +5V level on DCD by setting JP1 and JP2, respectively. When this port is set to +12V or +5V level, please make sure its communication mode is RS-232 (see BIOS setting in section 6.4).

Function	JP1 Setting
Data: Set CN6 pin 18 to RI (Default)	1-2 close
Power: Set CN6 pin 18 to +12V level	2-3 close

Function	JP2 Setting
Data: Set CN6 pin 10 to DCD (Default)	1-2 close
Power: Set CN6 pin 10 to +5V level	2-3 close

3.5 AX93277 Connectors, Switches and LED

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows connectors, switches and LED on the hardware.

Connector	Description
CN2	High Speed Board to Board Connector
CN5	System Power Switch
CN6	COM Connector
CN8	Audio Jack
CN9	System Reset Switch
CN10	Low Speed Board to Board Connector
USB1~USB2	USB 2.0 Connectors
D1	Power and HDD LED Indicator

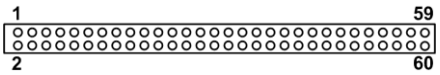
3.5.1 High and Low Speed Board to Board Connectors (CN2 and CN10)

CN2 is a 2x20-pin high speed board to board connector. The pin assignments of CN2 are given as follows.

Pin	Signal	Pin	Signal
1	USB3_TX0_DP	2	DP0_HPD
3	USB3_TX0_DN	4	DP0_AUX_P
5	GND	6	DP0_AUX_N
7	USB3_RX0_DP	8	GND
9	USB3_RX0_DN	10	DP0_TX3_P
11	GND	12	DP0_TX3_N
13	USB3_TX1_DP	14	GND
15	USB3_TX1_DN	16	DP0_TX2_P
17	GND	18	DP0_TX2_N
19	USB3_RX1_DP	20	+5V
21	USB3_RX1_DN	22	DP0_TX1_P
23	GND	24	DP0_TX1_N
25	N/A	26	GND
27	PCIE_TXP2	28	DP0_TX0_P
29	PCIE_TXN2	30	DP0_TX0_N
31	GND	32	GND
33	PCIE_RXP2	34	PCIE_LAN1_CLK_P
35	PCIE_RXN2	36	PCIE_LAN1_CLK_N
37	GND	38	GND
39	PCIE_RST#	40	PCIE_WAKE_UP#

CN10 is a 2x30-pin low speed board to board connector. The pin assignments of CN10 are given as follows.

Pin	Signal	Pin	Signal
1	MIC_IN	2	LINE_O_L
3	LINE_IN_L	4	LINE_O_R
5	LINE_IN_R	6	AUDIO_GND
7	AUDIO_GND	8	+5V
9	COMGND	10	+5V
11	DCD1	12	DSR1
13	RXD1	14	RTS1
15	TXD1	16	CTS1
17	DTR1	18	RI1
19	COMGND	20	+5V
21	DCD2	22	DSR2
23	RXD2	24	RTS2
25	TXD2	26	CTS2
27	DTR2	28	RI2
29	GND	30	GND
31	USB_PWR0	32	USB_PWR0
33	C_USB_PN6	34	C_USB_PN7
35	C_USB_PP6	36	C_USB_PP7
37	USB0_GND	38	USB0_GND
39	USB_PWR1	40	USB_PWR1
41	C_USB_PN8	42	C_USB_PN9
43	C_USB_PP8	44	C_USB_PP9
45	USB1_GND	46	USB1_GND
47	+3.3V	48	GND
49	+3.3V	50	GND
51	+3.3V_DUAL	52	FP_PSIN_N
53	+3.3V_DUAL	54	GND
55	HW_RESET_N	56	+5V
57	HDD_ACT#	58	+12V
59	GND	60	+12V



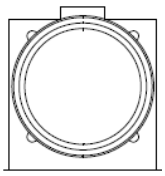
Note

Please gently insert CN2 and CN10 into CN4 and CN5 on PICO121.

3.5.2 System Power Switch (CN5)

This switch is for turning on/off the system power.

Function	Description
On	Turn on/off system
Off	Keep system status

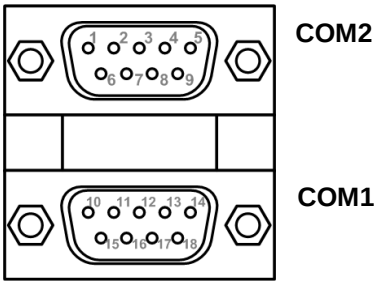


3.5.3 COM Connector (CN6)

CN6 is a double-deck DB-9 connector for COM1 (lower) and COM2 (upper). COM1 comes with power capability on DCD and RI pins by setting jumpers (see section 3.4.1). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to BIOS setting in section 6.4.

COM1:

Pin	RS-232	RS-422	RS-485
10	DCD	TX-	Data-
11	RXD	TX+	Data+
12	TXD	RX+	N.C
13	DTR	RX-	N.C.
14	GND	No use	No use
15	DSR	No use	No use
16	RTS	No use	No use
17	CTS	No use	No use
18	RI	No use	No use



COM2

COM1

COM2:

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

3.5.4 Audio Jack (CN8)

This is audio jack with HD audio support. Install audio driver, and then attach audio devices to CN8.

Pin Color	Signal
Green	Line-out
Pink	MIC-in

3.5.5 System Reset Switch (CN9)

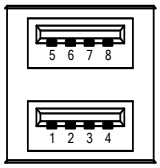
This switch reboots your computer without turning off the power supply. It is a better way to reboot your system for a longer life of the system power supply.

Function	Description
On	Reset system
Off	Keep system status

3.5.6 USB 2.0 Connectors (USB1 and USB2)

The board comes with two double-deck Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connectors on the rear I/O for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	+5V	5	+5V
2	USB1/3_DATA-	6	USB2/4_DATA-
3	USB1/3_DATA+	7	USB2/4_DATA+
4	GND	8	GND

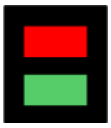


3.5.7 Power and HDD LED Indicator (D1)

The red LED is linked to Hard Disk Drive (HDD) activity signal. LED flashes every time HDD is accessed.

The power LED (green) lights up and will remain steady while the system is powered on.

LED Color	Description
Red	Hard disk drive activity
Green	Power on/off



Chapter 4
AX93267 I/O Board

The AX93267 is an I/O expansion board which is suggested to connect to PICO121. Its specifications and detailed information are given in this chapter.

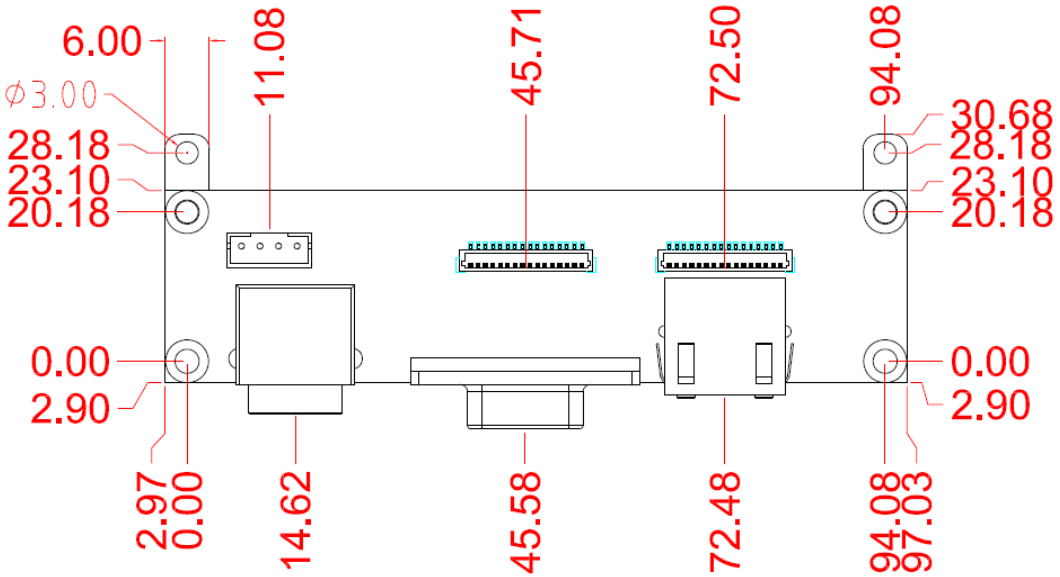
4.1 AX93267 Specifications

- **Size**
  - 29.25mm x 118mm

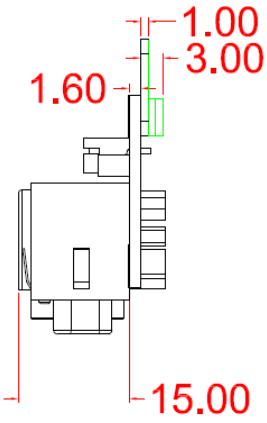
- **Features**
  - One D-Sub VGA port
  - One RJ-45 Ethernet port.
  - DC power jack.

Note: ***All specifications and images are subject to change without notice.***

4.2 AX93267 Dimensions and Fixing Holes

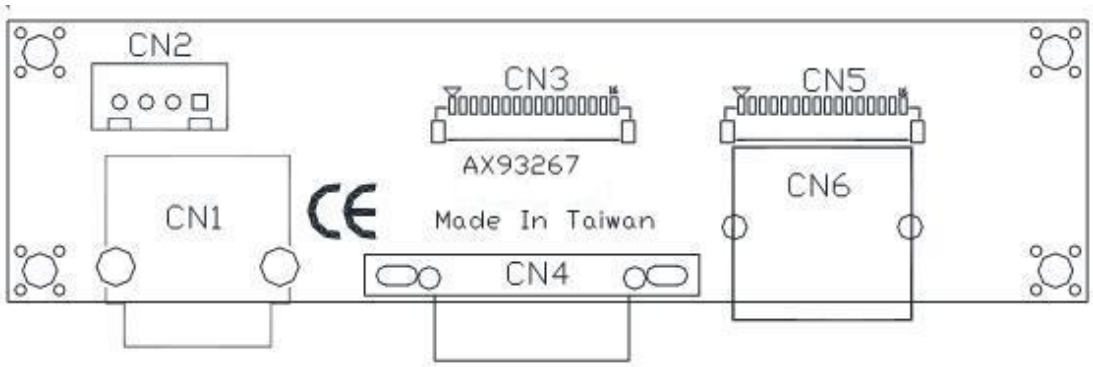


Top View

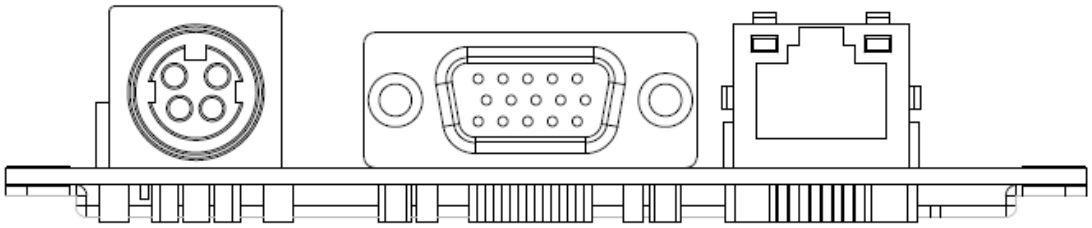


Side View

4.3 AX93267 Board Layout



Top View



Side View

4.4 AX93267 Connectors

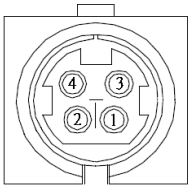
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

Connector	Description
CN1	DC Power Jack
CN2	DC Power In Connector
CN3	VGA Connector
CN4	D-Sub VGA Connector
CN5	Ethernet Connector
CN6	RJ-45 Ethernet Port

4.4.1 DC Power Jack (CN1)

The CN1 is a DC power jack for DC +12V input.

Pin	Signal
1	GND
2	GND
3	+12V
4	+12V



4.4.2 DC Power In Connector (CN2)

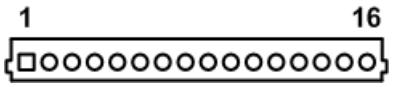
This is a 1x4-pin wafer connector for DC +12V input. It is suggested to connect this CN2 to PICO121's CN12.

Pin	Signal
1	+12V
2	+12V
3	GND
4	GND

4.4.3 VGA Connector (CN3)

This is a 16-pin wafer connector for VGA interface. Gently connect this CN3 to PICO121's CN13.

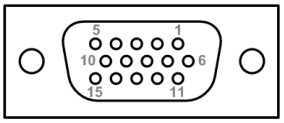
Pin	Signal
1	RSVD
2	RED
3	GND
4	GREEN
5	GND
6	BLUE
7	GND
8	VCC
9	DDC_DATA
10	GND
11	GND
12	HSYNC
13	GND
14	VSYNC
15	DDC_CLK
16	GND



4.4.4 D-Sub VGA Connector (CN4)

The CN4 is a standard 15-pin D-Sub connector. It is commonly used for VGA display. This VGA interface configuration can be configured via software utility.

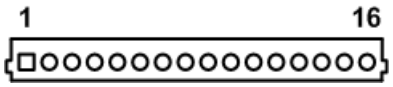
Pin	Signal	Pin	Signal
1	RED	2	GREEN
3	BLUE	4	N.C
5	GND	6	CRT_DETE
7	GND	8	GND
9	CRT_VCC	10	GND
11	N.C	12	DDC_DATA
13	Hsync	14	Vsync
15	DDC_CLK		



4.4.5 Ethernet Connector (CN5)

This is a 16-pin wafer connector for Ethernet interface. Gently connect this CN5 to PICO121's LAN1.

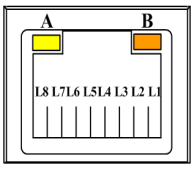
Pin	Signal
1	1000 LAN LED
2	100 LAN LED
3	GND
4	MDI3-
5	MDI3+
6	MDI1-
7	MDI2-
8	MDI2+
9	MDI1+
10	MDI0-
11	MDI0+
12	GND
13	LAN_VDD33
14	LAN_LINK_ACT
15	GND
16	GND



4.4.6 RJ-45 Ethernet Port (CN6)

This board has one RJ-45 Ethernet connector. Connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pin	Signal	Pin	Signal
L1	MDI0P	L5	MDI2P
L2	MDI0N	L6	MDI2N
L3	MDI1P	L7	MDI3P
L4	MDI1N	L8	MDI3N
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		



Chapter 5
Hardware Description

5.1 Microprocessors

The PICO121 supports AMD G-Series Embedded SoC GX-210HA/GX-210JA processors, which enable your system to operate under Windows® 7 and Windows® 8 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

5.2 BIOS

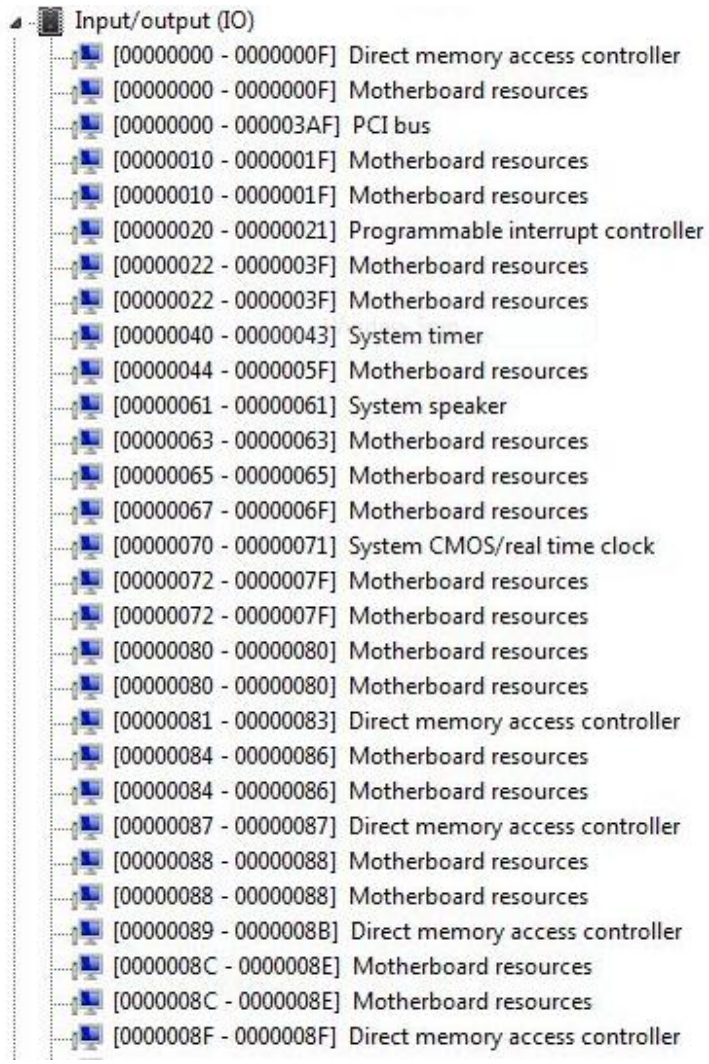
The PICO121 uses AMI Plug and Play BIOS with a single 16Mbit SPI Flash.

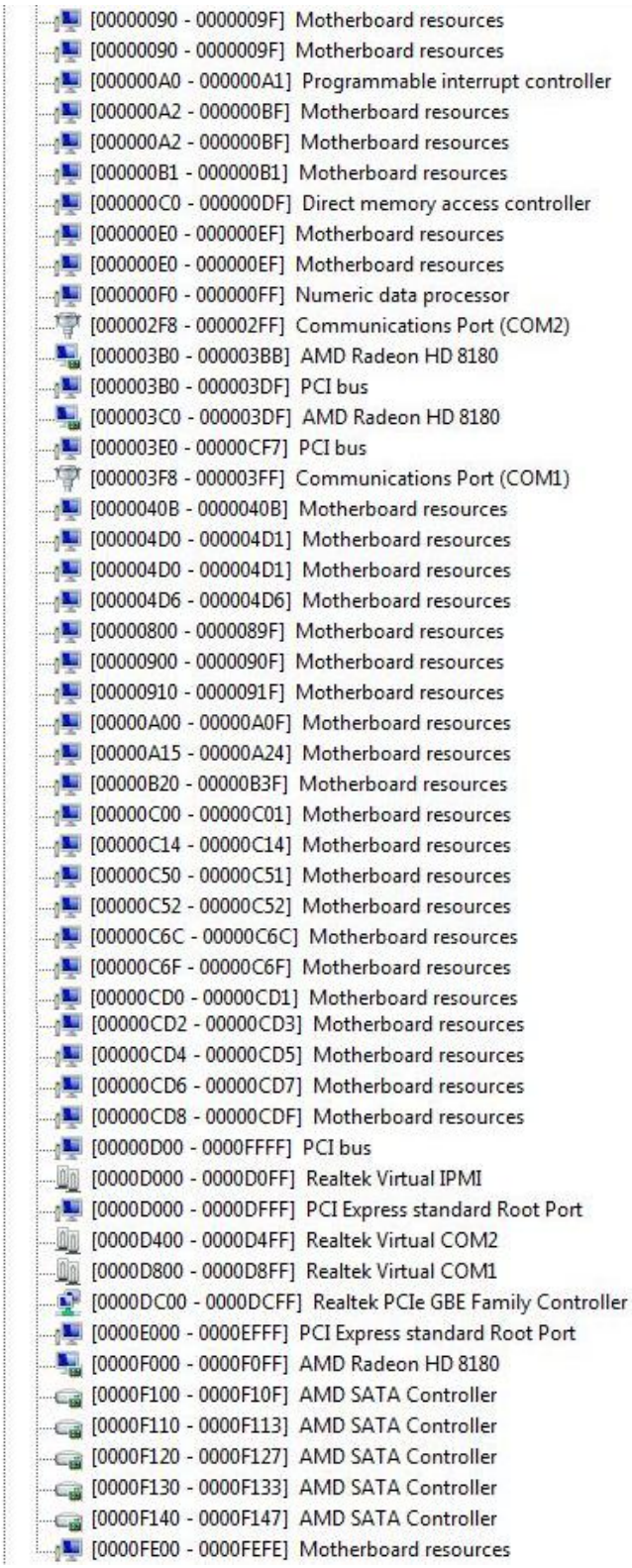
5.3 System Memory

The PICO121 supports one 204-pin DDR3/3L SO-DIMM socket for a maximum memory of 8GB DDR3/3L SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

5.4 I/O Port Address Map

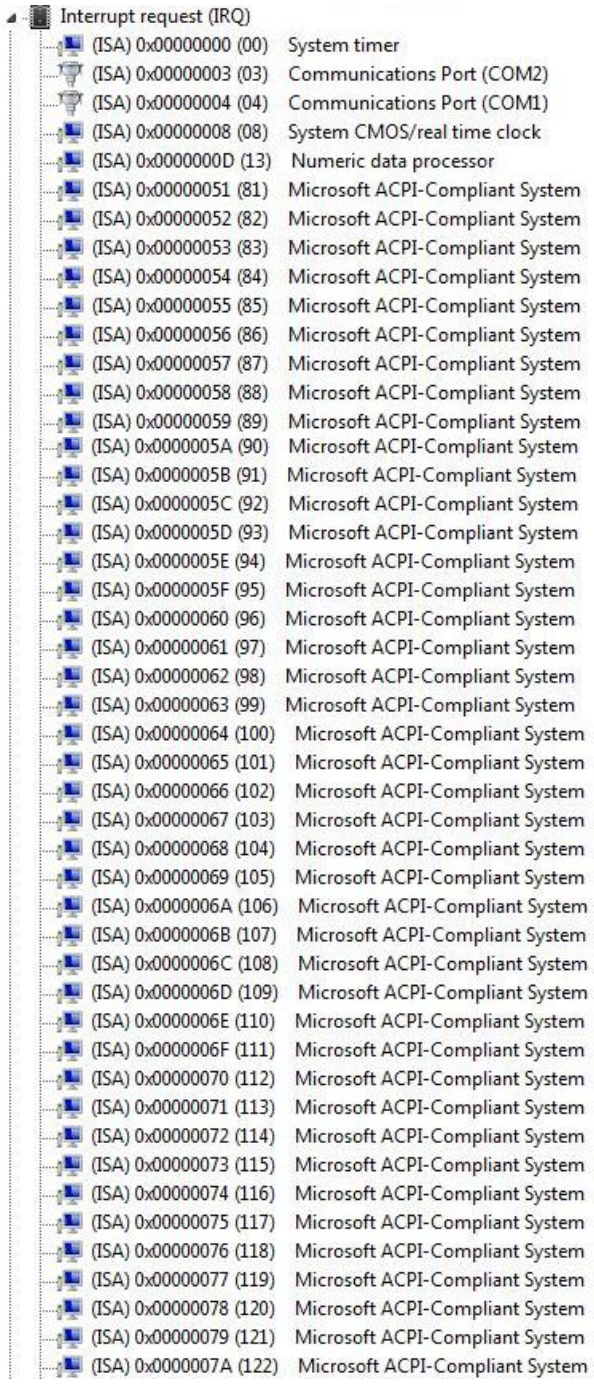
The AMD G-Series Embedded SoC GX-210HA/GX-210JA processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.


Input/output (IO)
[00000000 - 0000000F] Direct memory access controller
[00000000 - 0000000F] Motherboard resources
[00000000 - 000003AF] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000022 - 0000003F] Motherboard resources
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[00000061 - 00000061] System speaker
[00000063 - 00000063] Motherboard resources
[00000065 - 00000065] Motherboard resources
[00000067 - 0000006F] Motherboard resources
[00000070 - 00000071] System CMOS/real time clock
[00000072 - 0000007F] Motherboard resources
[00000072 - 0000007F] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000081 - 00000083] Direct memory access controller
[00000084 - 00000086] Motherboard resources
[00000084 - 00000086] Motherboard resources
[00000087 - 00000087] Direct memory access controller
[00000088 - 00000088] Motherboard resources
[00000088 - 00000088] Motherboard resources
[00000089 - 0000008B] Direct memory access controller
[0000008C - 0000008E] Motherboard resources
[0000008C - 0000008E] Motherboard resources
[0000008F - 0000008F] Direct memory access controller

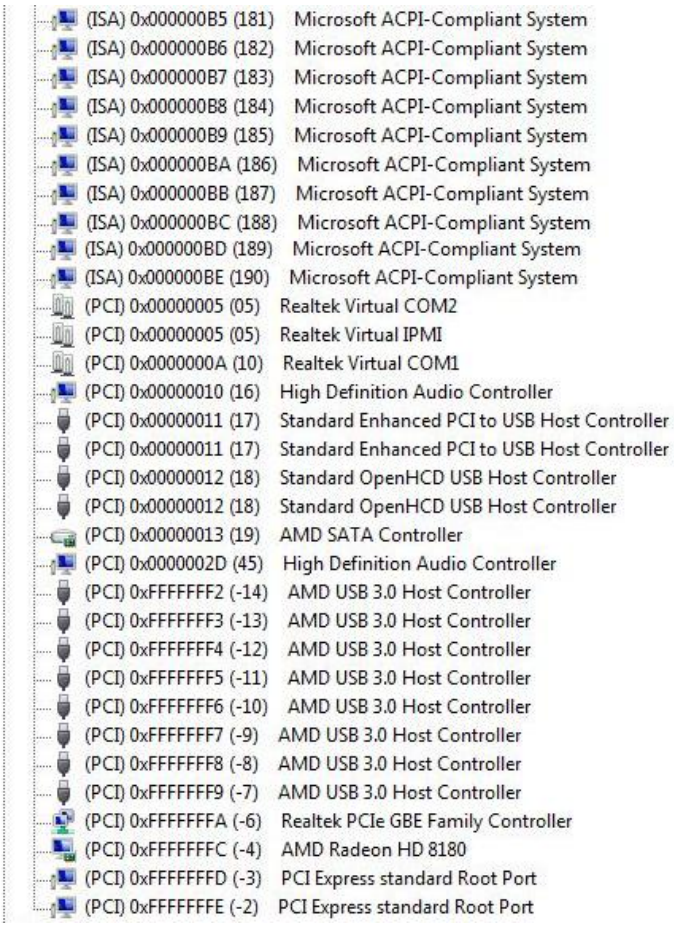

[00000090 - 0000009F] Motherboard resources
[00000090 - 0000009F] Motherboard resources
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A2 - 000000BF] Motherboard resources
[000000B1 - 000000B1] Motherboard resources
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000FF] Numeric data processor
[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] AMD Radeon HD 8180
[000003B0 - 000003DF] PCI bus
[000003C0 - 000003DF] AMD Radeon HD 8180
[000003E0 - 00000CF7] PCI bus
[000003F8 - 000003FF] Communications Port (COM1)
[0000040B - 0000040B] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[000004D6 - 000004D6] Motherboard resources
[00000800 - 0000089F] Motherboard resources
[00000900 - 0000090F] Motherboard resources
[00000910 - 0000091F] Motherboard resources
[00000A00 - 00000A0F] Motherboard resources
[00000A15 - 00000A24] Motherboard resources
[00000B20 - 00000B3F] Motherboard resources
[00000C00 - 00000C01] Motherboard resources
[00000C14 - 00000C14] Motherboard resources
[00000C50 - 00000C51] Motherboard resources
[00000C52 - 00000C52] Motherboard resources
[00000C6C - 00000C6C] Motherboard resources
[00000C6F - 00000C6F] Motherboard resources
[00000CD0 - 00000CD1] Motherboard resources
[00000CD2 - 00000CD3] Motherboard resources
[00000CD4 - 00000CD5] Motherboard resources
[00000CD6 - 00000CD7] Motherboard resources
[00000CD8 - 00000CDF] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[0000D000 - 0000D0FF] Realtek Virtual IPMI
[0000D000 - 0000DFFF] PCI Express standard Root Port
[0000D400 - 0000D4FF] Realtek Virtual COM2
[0000D800 - 0000D8FF] Realtek Virtual COM1
[0000DC00 - 0000DCFF] Realtek PCIe GBE Family Controller
[0000E000 - 0000EFFF] PCI Express standard Root Port
[0000F000 - 0000F0FF] AMD Radeon HD 8180
[0000F100 - 0000F10F] AMD SATA Controller
[0000F110 - 0000F113] AMD SATA Controller
[0000F120 - 0000F127] AMD SATA Controller
[0000F130 - 0000F133] AMD SATA Controller
[0000F140 - 0000F147] AMD SATA Controller
[0000FE00 - 0000FEFE] Motherboard resources

5.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

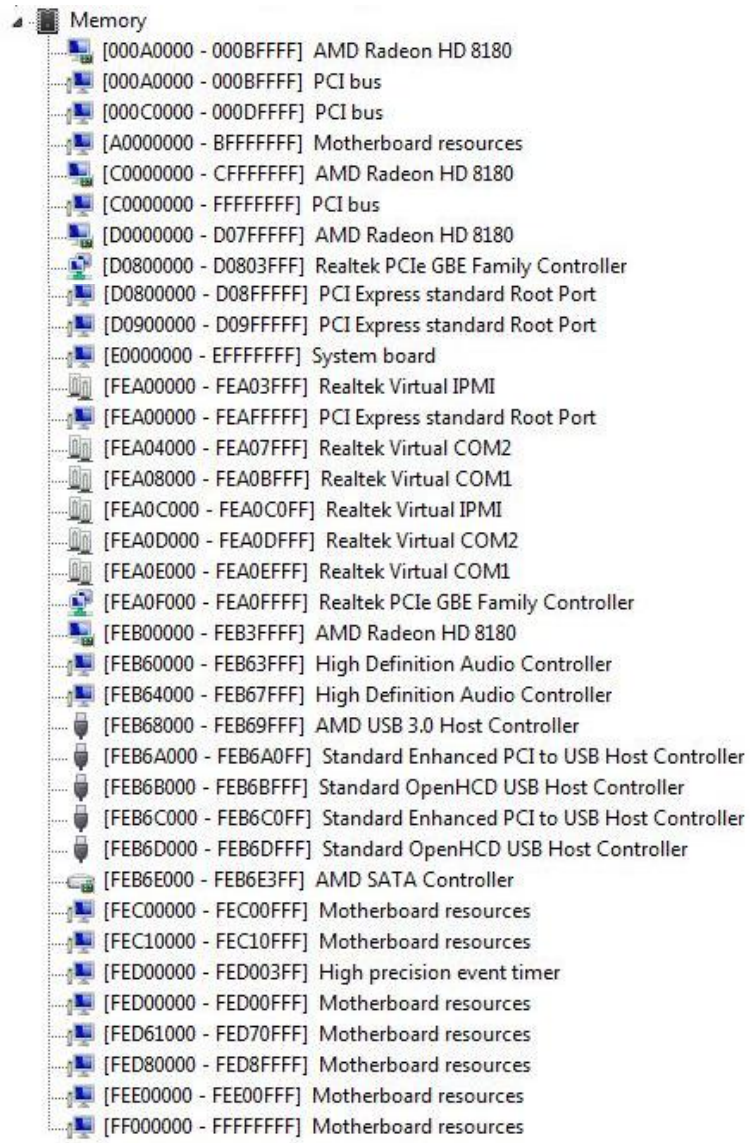

Interrupt request (IRQ)
(ISA) 0x00000000 (00) System timer
(ISA) 0x00000003 (03) Communications Port (COM2)
(ISA) 0x00000004 (04) Communications Port (COM1)
(ISA) 0x00000008 (08) System CMOS/real time clock
(ISA) 0x0000000D (13) Numeric data processor
(ISA) 0x00000051 (81) Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82) Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83) Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84) Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85) Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86) Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87) Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88) Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89) Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90) Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91) Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92) Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93) Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94) Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95) Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96) Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97) Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98) Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99) Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100) Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101) Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102) Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103) Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104) Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105) Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106) Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107) Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108) Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109) Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110) Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111) Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112) Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113) Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114) Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115) Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116) Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117) Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118) Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119) Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120) Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121) Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122) Microsoft ACPI-Compliant System

(ISA) 0x0000007B (123) Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124) Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125) Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126) Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127) Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128) Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129) Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130) Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131) Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132) Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System


(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x00000005 (05) Realtek Virtual COM2
(PCI) 0x00000005 (05) Realtek Virtual IPMI
(PCI) 0x0000000A (10) Realtek Virtual COM1
(PCI) 0x00000010 (16) High Definition Audio Controller
(PCI) 0x00000011 (17) Standard Enhanced PCI to USB Host Controller
(PCI) 0x00000011 (17) Standard Enhanced PCI to USB Host Controller
(PCI) 0x00000012 (18) Standard OpenHCD USB Host Controller
(PCI) 0x00000012 (18) Standard OpenHCD USB Host Controller
(PCI) 0x00000013 (19) AMD SATA Controller
(PCI) 0x0000002D (45) High Definition Audio Controller
(PCI) 0xFFFFFFF2 (-14) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF3 (-13) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF4 (-12) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF5 (-11) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF6 (-10) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF7 (-9) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF8 (-8) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFF9 (-7) AMD USB 3.0 Host Controller
(PCI) 0xFFFFFFFA (-6) Realtek PCIe GBE Family Controller
(PCI) 0xFFFFFFFC (-4) AMD Radeon HD 8180
(PCI) 0xFFFFFFFD (-3) PCI Express standard Root Port
(PCI) 0xFFFFFFFE (-2) PCI Express standard Root Port

5.6 Memory Map

The memory mapping list is shown as follows:


Memory
[000A0000 - 000BFFFF] AMD Radeon HD 8180
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[A0000000 - BFFFFFFF] Motherboard resources
[C0000000 - CFFFFFFF] AMD Radeon HD 8180
[C0000000 - FFFFFFFF] PCI bus
[D0000000 - D07FFFFF] AMD Radeon HD 8180
[D0800000 - D0803FFF] Realtek PCIe GBE Family Controller
[D0800000 - D08FFFFF] PCI Express standard Root Port
[D0900000 - D09FFFFF] PCI Express standard Root Port
[E0000000 - EFFFFFFF] System board
[FEA00000 - FEA03FFF] Realtek Virtual IPMI
[FEA00000 - FEAFFFFF] PCI Express standard Root Port
[FEA04000 - FEA07FFF] Realtek Virtual COM2
[FEA08000 - FEA0BFFF] Realtek Virtual COM1
[FEA0C000 - FEA0C0FF] Realtek Virtual IPMI
[FEA0D000 - FEA0DFFF] Realtek Virtual COM2
[FEA0E000 - FEA0EFFF] Realtek Virtual COM1
[FEA0F000 - FEA0FFFF] Realtek PCIe GBE Family Controller
[FEB00000 - FEB3FFFF] AMD Radeon HD 8180
[FEB60000 - FEB63FFF] High Definition Audio Controller
[FEB64000 - FEB67FFF] High Definition Audio Controller
[FEB68000 - FEB69FFF] AMD USB 3.0 Host Controller
[FEB6A000 - FEB6A0FF] Standard Enhanced PCI to USB Host Controller
[FEB6B000 - FEB6BFFF] Standard OpenHCD USB Host Controller
[FEB6C000 - FEB6C0FF] Standard Enhanced PCI to USB Host Controller
[FEB6D000 - FEB6DFFF] Standard OpenHCD USB Host Controller
[FEB6E000 - FEB6E3FF] AMD SATA Controller
[FEC00000 - FEC00FFF] Motherboard resources
[FEC10000 - FEC10FFF] Motherboard resources
[FED00000 - FED003FF] High precision event timer
[FED00000 - FED00FFF] Motherboard resources
[FED61000 - FED70FFF] Motherboard resources
[FED80000 - FED8FFFF] Motherboard resources
[FEE00000 - FEE00FFF] Motherboard resources
[FF000000 - FFFFFFFF] Motherboard resources

This page is intentionally left blank.

Chapter 6
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

6.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP7 (see section 2.4.7).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

6.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

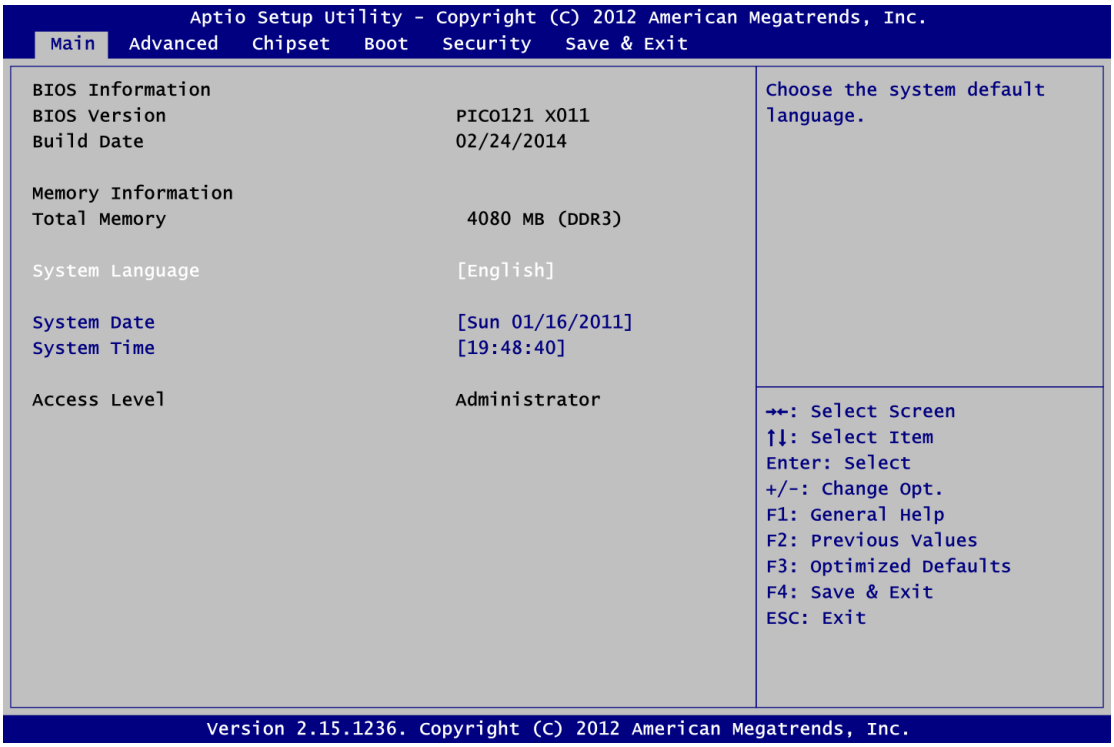
Note

Some of the navigation keys differ from one screen to another .

Hot Keys	Description
→← **Left/Right**	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ **Up/Down**	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

6.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



- **BIOS/Memory Information**
  Display the auto-detected BIOS/memory information.

- **System Language**
  Choose the system default language.

- **System Date/Time**
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

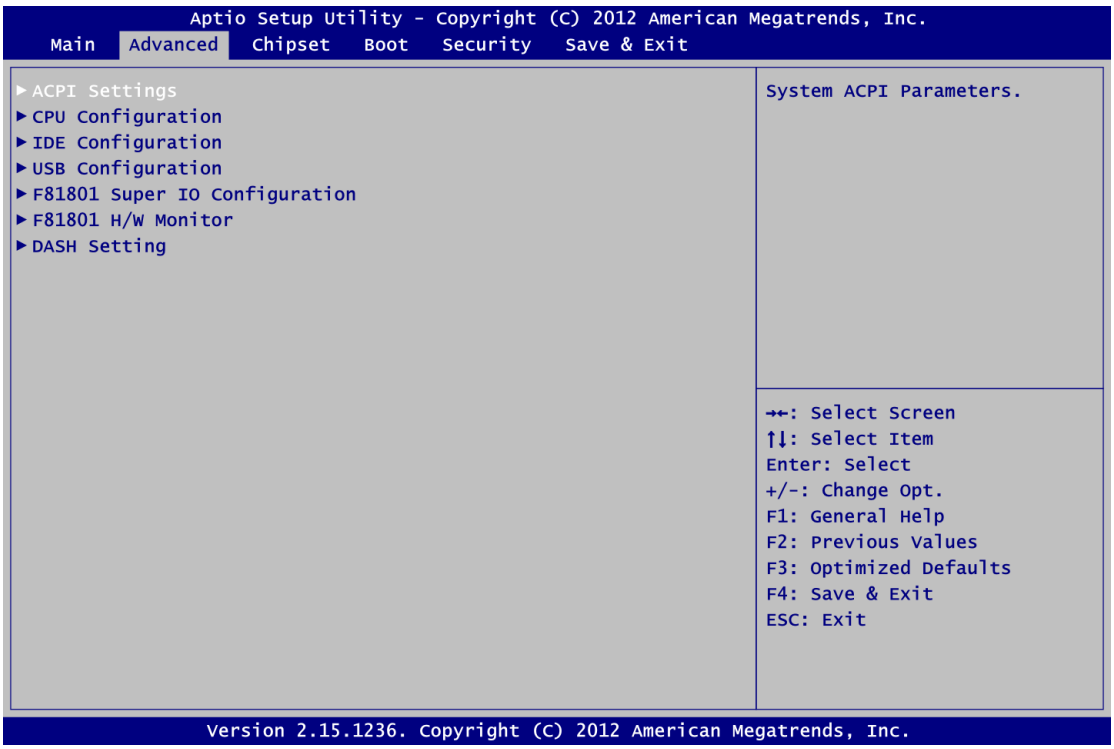
- **Access Level**
  Display the access level of current user.

6.4 Advanced Menu

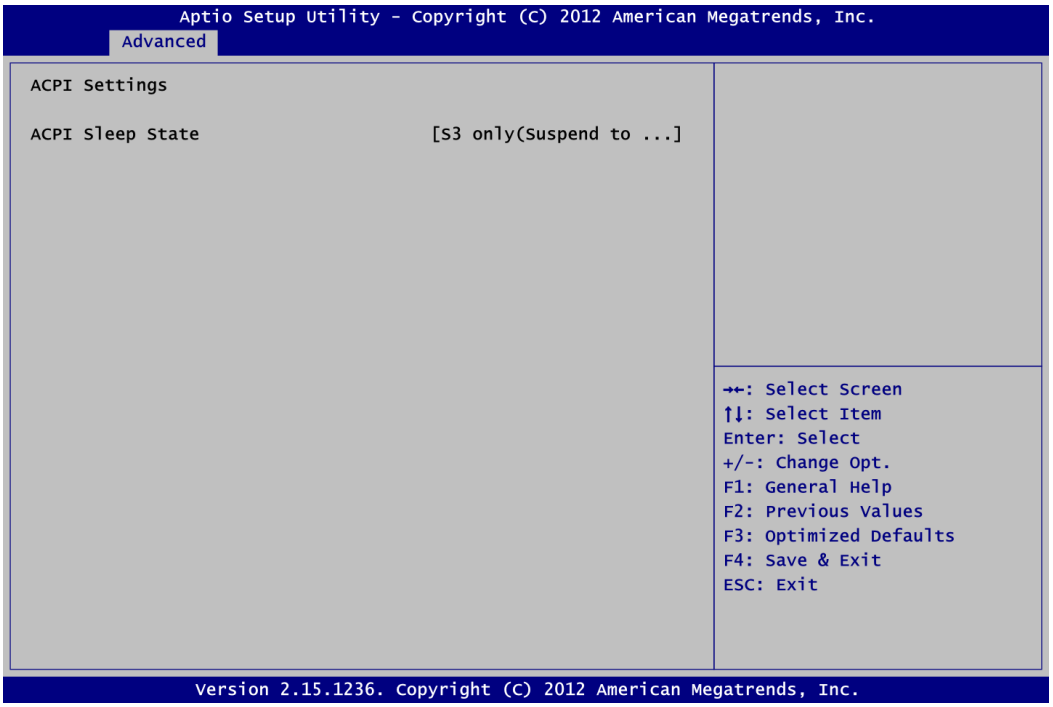
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ACPI Settings
- CPU Configuration
- IDE Configuration
- USB Configuration
- F81801 Super IO Configuration
- F81801 H/W Monitor
- DASH Setting

For items marked with "►", please press <Enter> for more options.

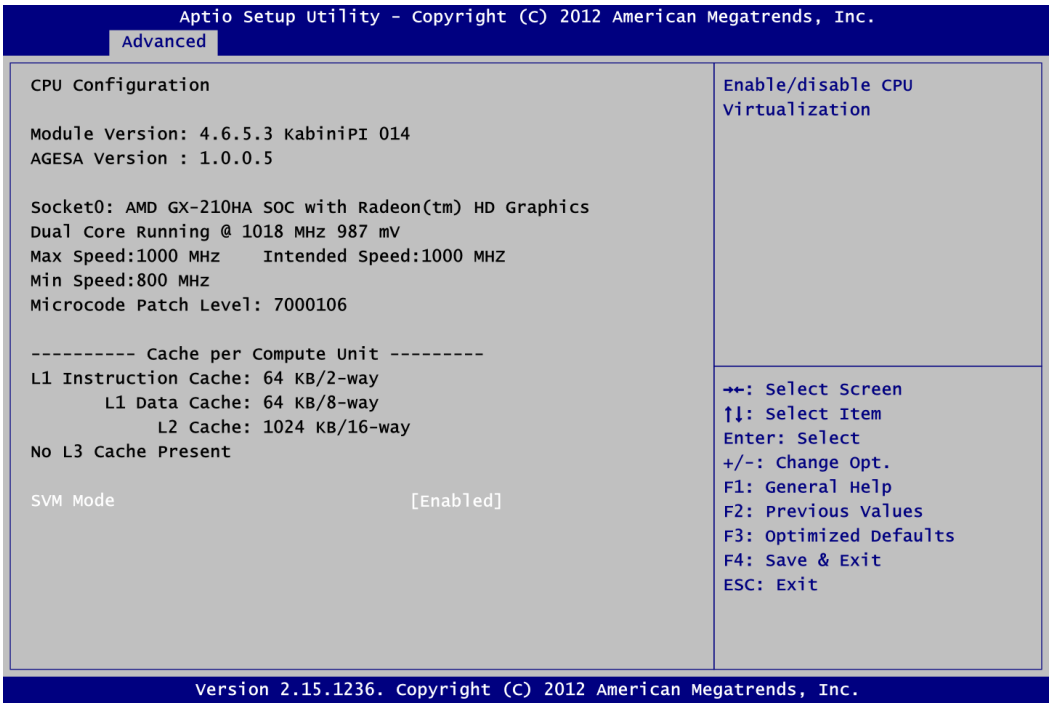


- **ACPI Settings**



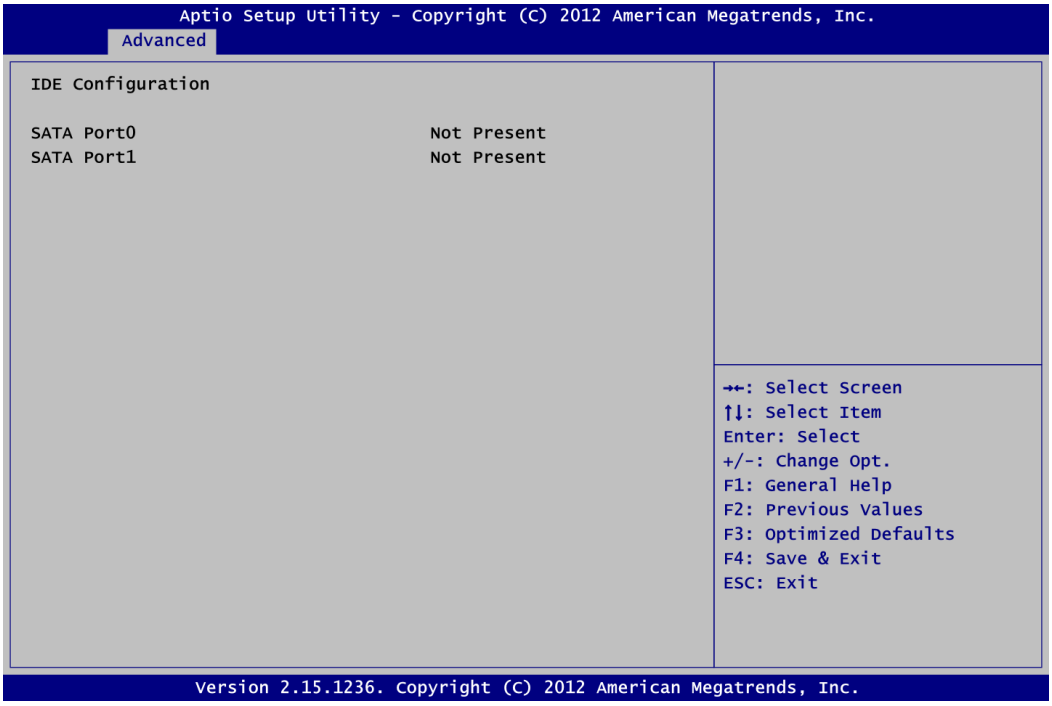
ACPI Sleep State
When the suspend button is pressed, the Advanced Configuration and Power Interface (ACPI) sleep state is S3 only (Suspend to RAM).

- **CPU Configuration**
  This screen shows the CPU Configuration.

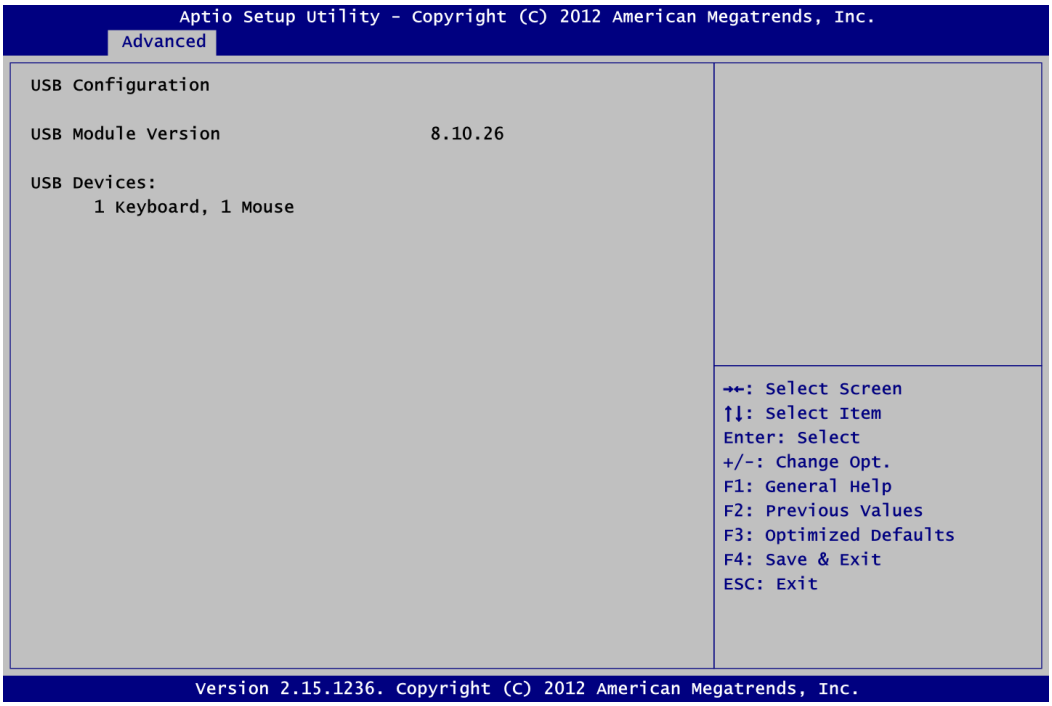

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
CPU Configuration
Module Version: 4.6.5.3 KabiniPI 014
AGESA Version : 1.0.0.5
Socket0: AMD GX-210HA SOC with Radeon(tm) HD Graphics
Dual Core Running @ 1018 MHz 987 mV
Max Speed:1000 MHz Intended Speed:1000 MHZ
Min Speed:800 MHz
Microcode Patch Level: 7000106
---------- Cache per Compute Unit ---------
L1 Instruction Cache: 64 KB/2-way
L1 Data Cache: 64 KB/8-way
L2 Cache: 1024 KB/16-way
No L3 Cache Present
SVM Mode [Enabled]
Enable/disable CPU Virtualization
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

SVM Mode
Enable or disable CPU virtualization (SVM).

- **IDE Configuration**
  In the IDE Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.

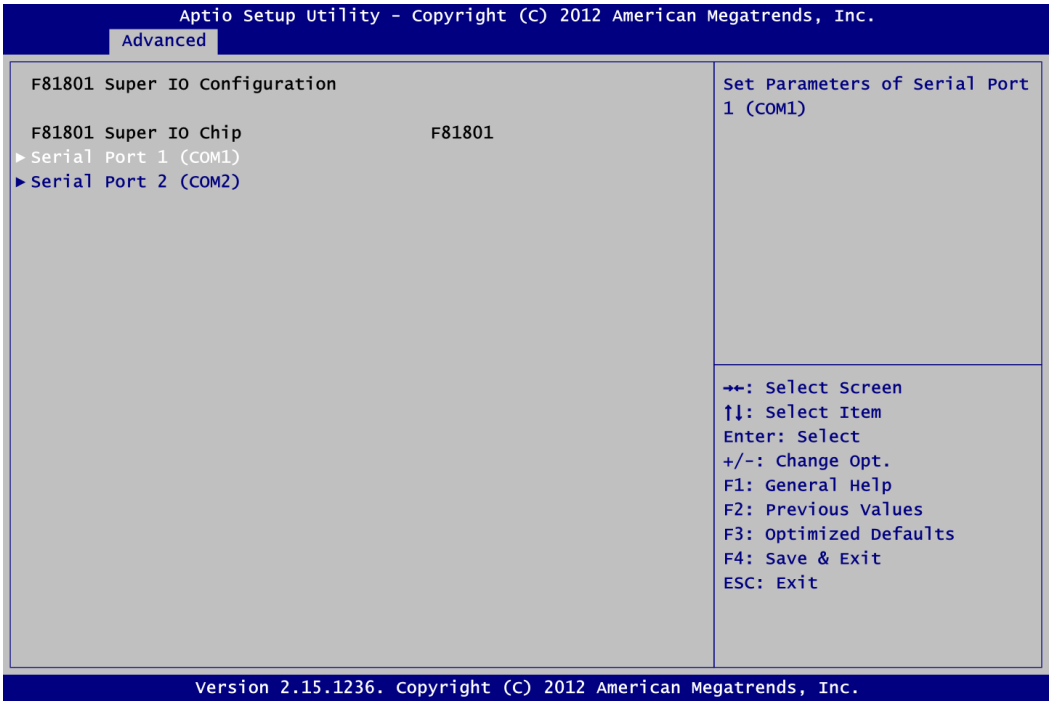


- **USB Configuration**



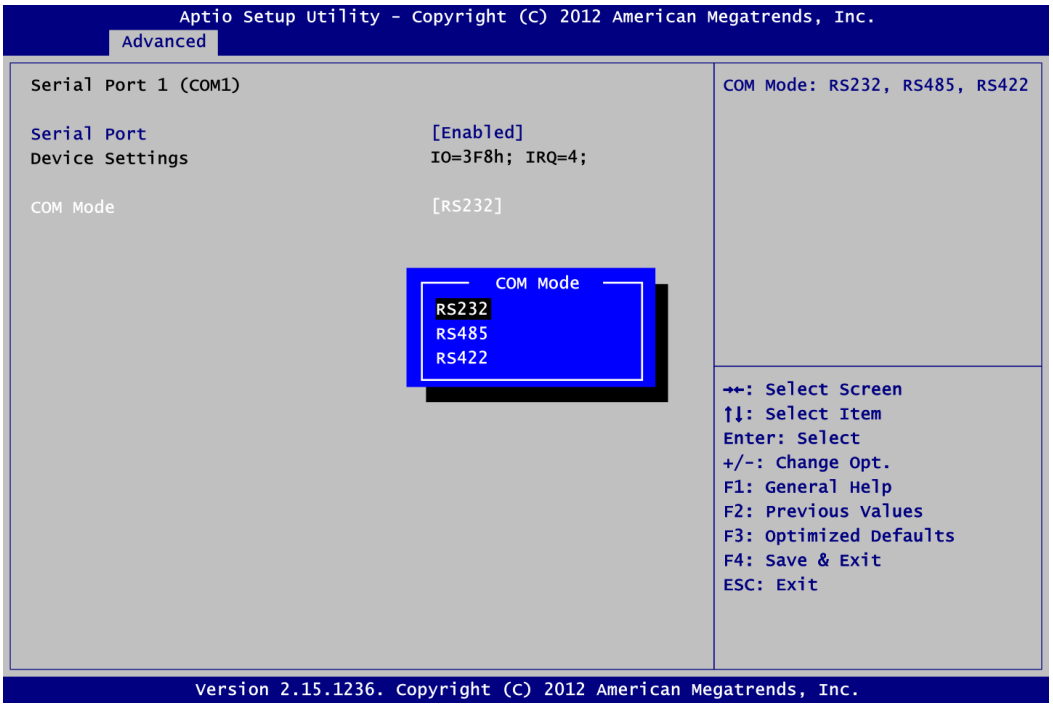
USB Devices
Display all detected USB devices.

- **F81801 Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
F81801 Super IO Configuration
F81801 Super IO Chip F81801
▶ Serial Port 1 (COM1)
▶ Serial Port 2 (COM2)
Set Parameters of Serial Port 1 (COM1)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Serial Port 1 (COM1)/Serial Port 2 (COM2)
Set parameters of serial port 1 (COM1)/serial port 2 (COM2).

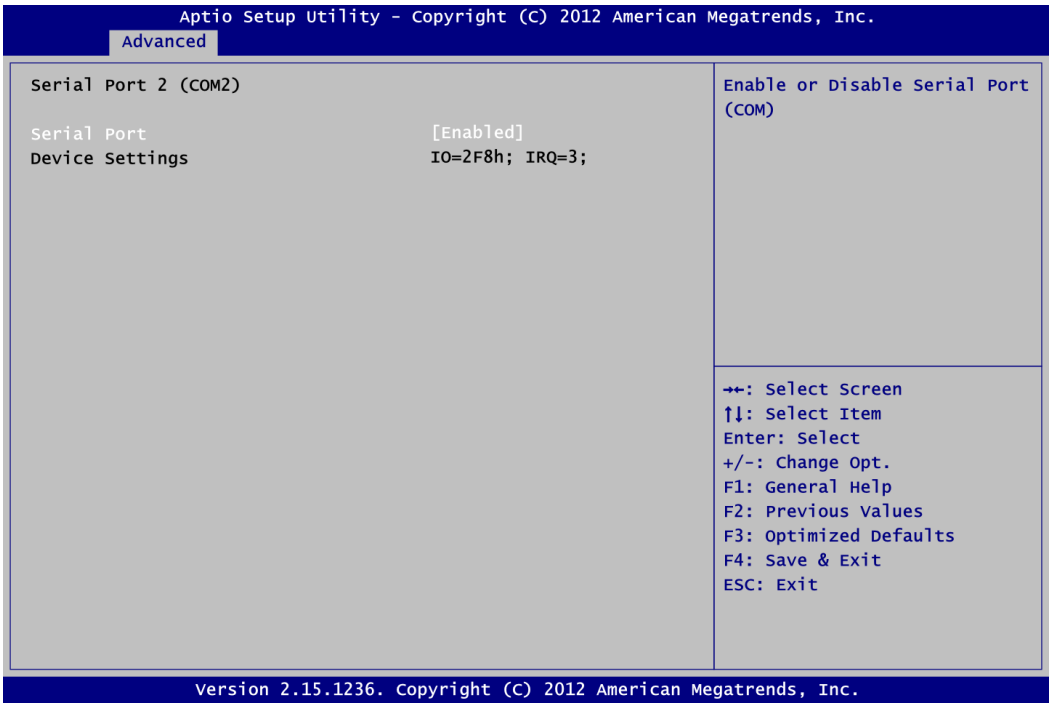
- **Serial Port 1 (COM1)**



Serial Port
Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

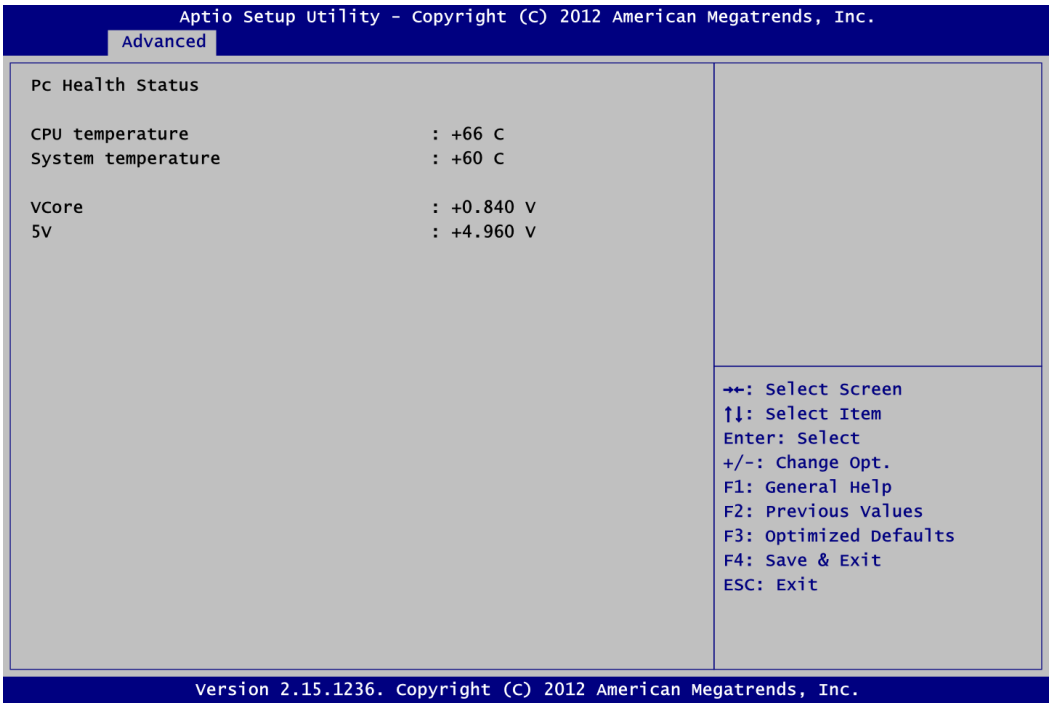
COM Mode
Use this option to set RS-232/RS-422/RS-485 communication mode for serial port 1.

- **Serial Port 2 (COM2)**



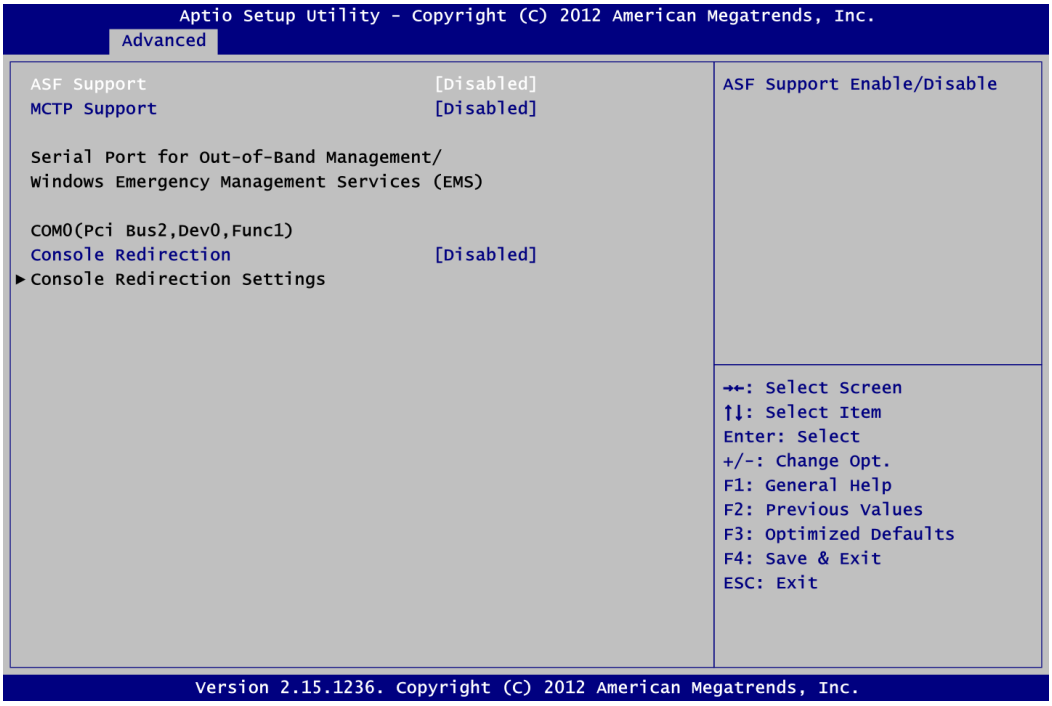
Serial Port
Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

- **F81801 H/W Monitor**
  This screen monitors hardware health status.



This screen displays the temperature of system and CPU, and also system voltages (VCore and 5V).

- **DASH Setting**
  You can use this screen to select options for the Desktop Architecture for System Hardware (DASH) providing the capability to remotely change BIOS settings. Further information about how to use the DASH can be found in Chapter 8.



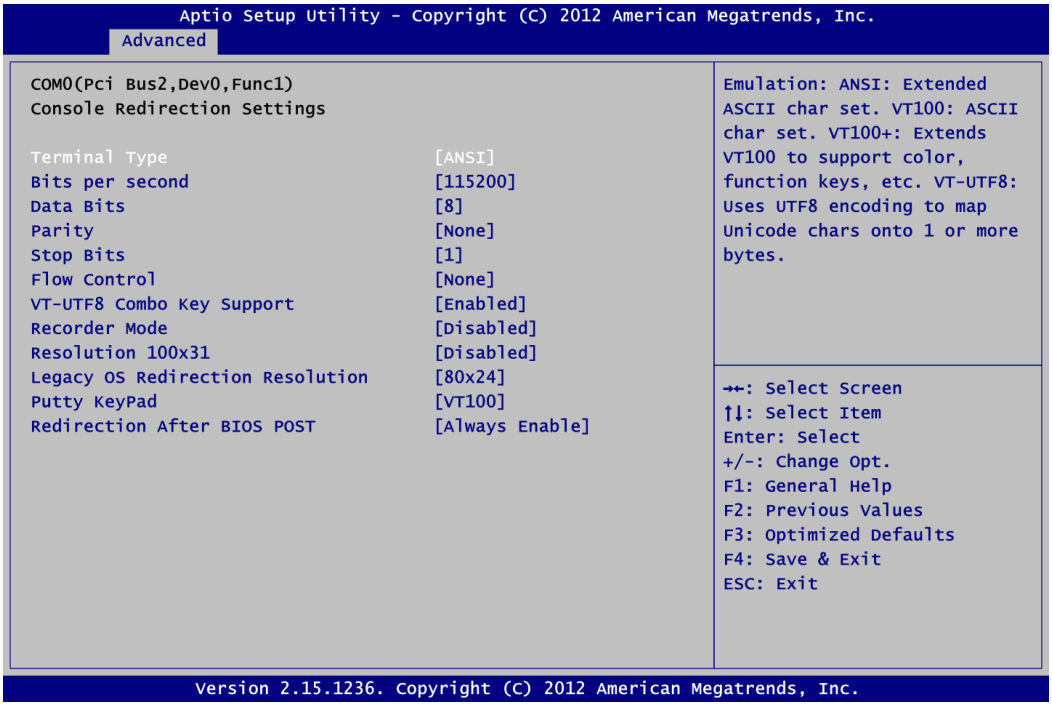
ASF Support
Enable or disable Alert Specification Format (ASF) support.

MCTP Support
Enable or disable Management Component Transport Protocol (MCTP) support.

Console Redirection
Enable or disable console redirection for Windows Emergency Management Services (EMS).

Console Redirection Settings
Display console redirection settings screen.

- **Console Redirection Settings**
  You can use this screen to set parameters for console redirection settings. Further information about how to use the DASH can be found in Chapter 8.

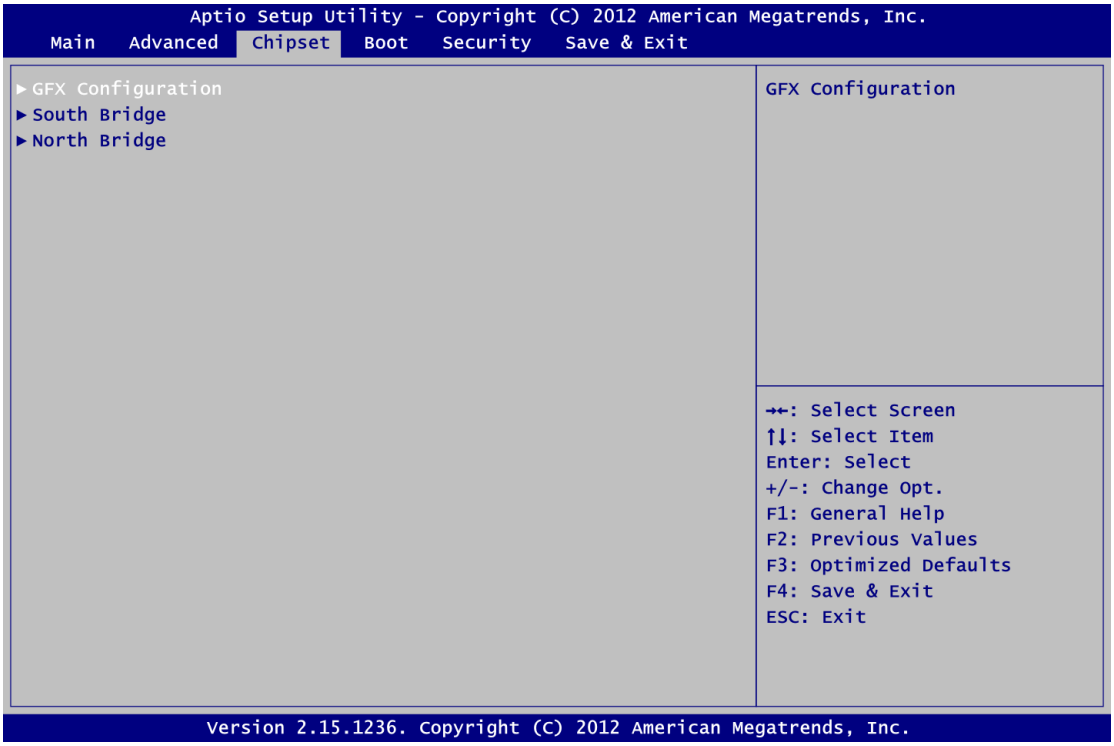

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
COM0(Pci Bus2,Dev0,Func1)
Console Redirection Settings
Terminal Type [ANSI]
Bits per second [115200]
Data Bits [8]
Parity [None]
Stop Bits [1]
Flow Control [None]
VT-UTF8 Combo Key Support [Enabled]
Recorder Mode [Disabled]
Resolution 100x31 [Disabled]
Legacy OS Redirection Resolution [80x24]
Putty KeyPad [VT100]
Redirection After BIOS POST [Always Enable]
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

6.5 Chipset Menu

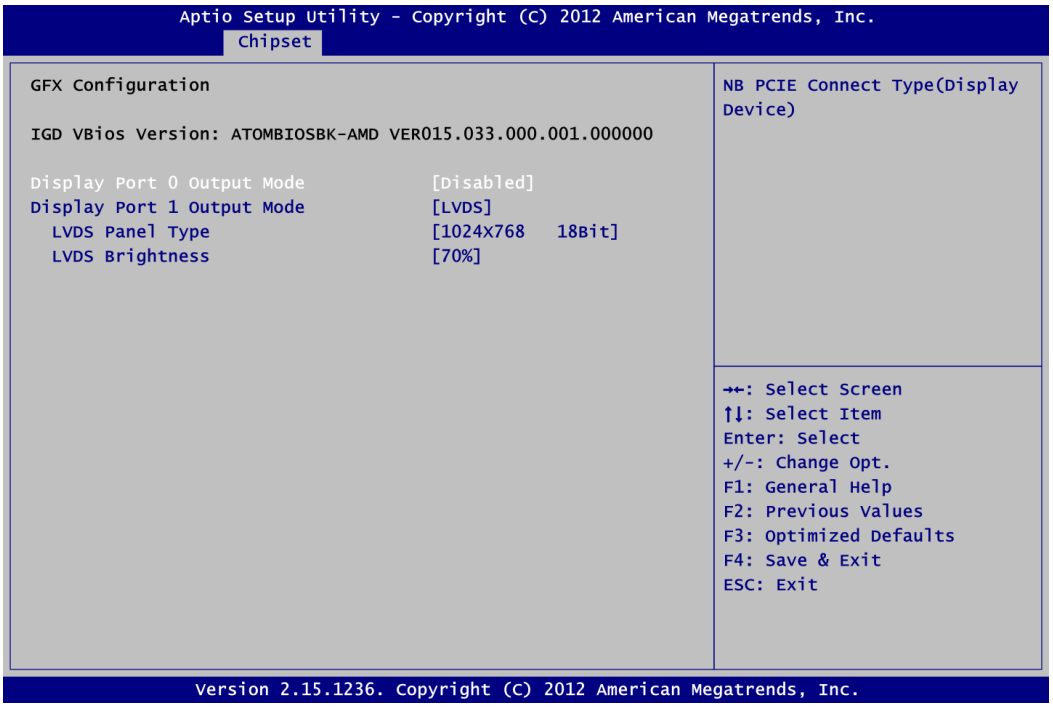
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► GFX Configuration
- ► South Bridge
- ► North Bridge

For items marked with "►", please press <Enter> for more options.



- **GFX Configuration**
  This screen is for GFX configuration.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
GFX Configuration
IGD VBios Version: ATOMBIOSBK-AMD VER015.033.000.001.000000
Display Port 0 Output Mode [Disabled]
Display Port 1 Output Mode [LVDS]
LVDS Panel Type [1024x768 18Bit]
LVDS Brightness [70%]
NB PCIE Connect Type(Display Device)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

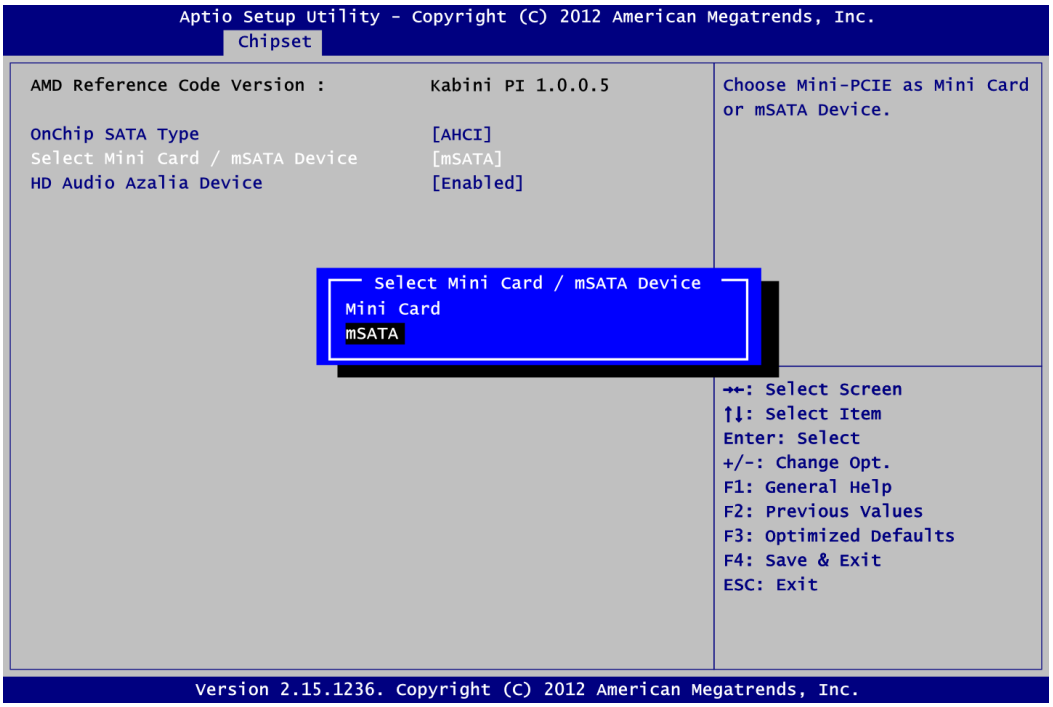
Display Port 0 Output Mode
Choose display port 0 output mode. The default is Disabled. Once AX93278 is installed, please choose HDMI (refer to Appendix A for AX93278 related information).

Display Port 1 Output Mode
Choose display port 1 output mode. The default is LVDS.

LVDS Panel Type
Set LVDS panel by selecting the appropriate setup item.

LVDS Brightness
Select the brightness of LVDS panel ranging from 30% to 100%. The default setting is 70%.

- **South Bridge**
  This screen allows users to configure parameters of South Bridge chipset.

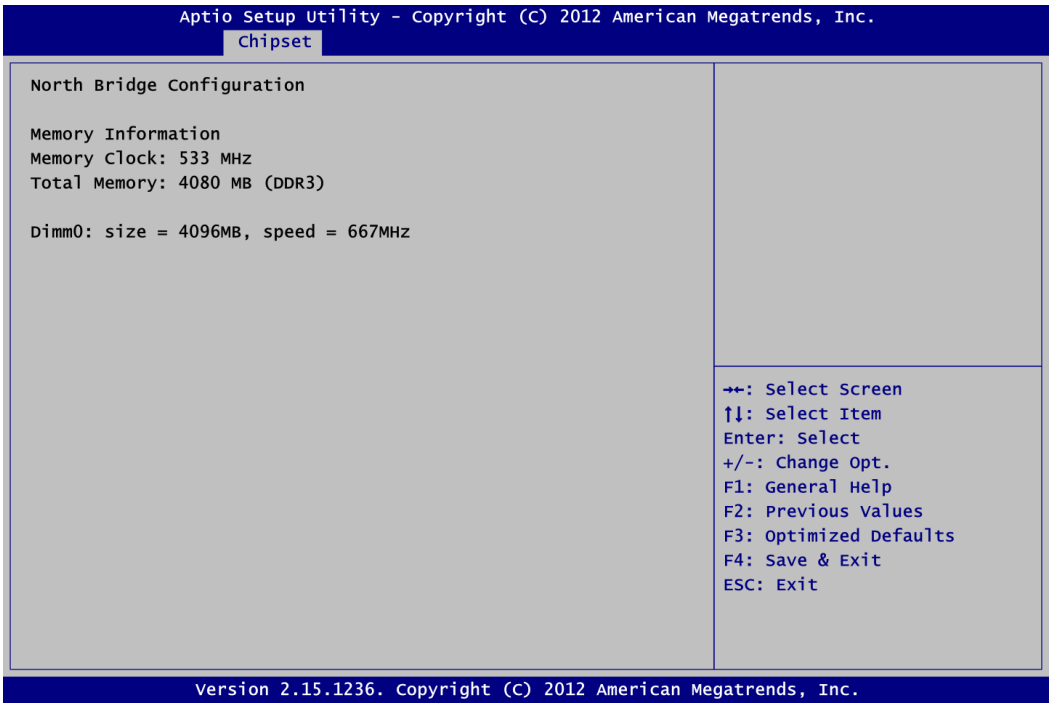

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
AMD Reference Code Version : Kabini PI 1.0.0.5
OnChip SATA Type [AHCI]
Select Mini Card / mSATA Device [mSATA]
HD Audio Azalia Device [Enabled]
Choose Mini-PCIE as Mini Card or mSATA Device.
Select Mini Card / mSATA Device
Mini Card
mSATA
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

OnChip SATA Type
Configuration options are Native IDE and AHCI.

Select Mini Card / mSATA Device
This setting is for SCN1 (see section 2.5.14). The default is mSATA. If PCI-Express Mini Card in PCI-Express x1 link is needed to insert to SCN1, please change setting to Mini Card.

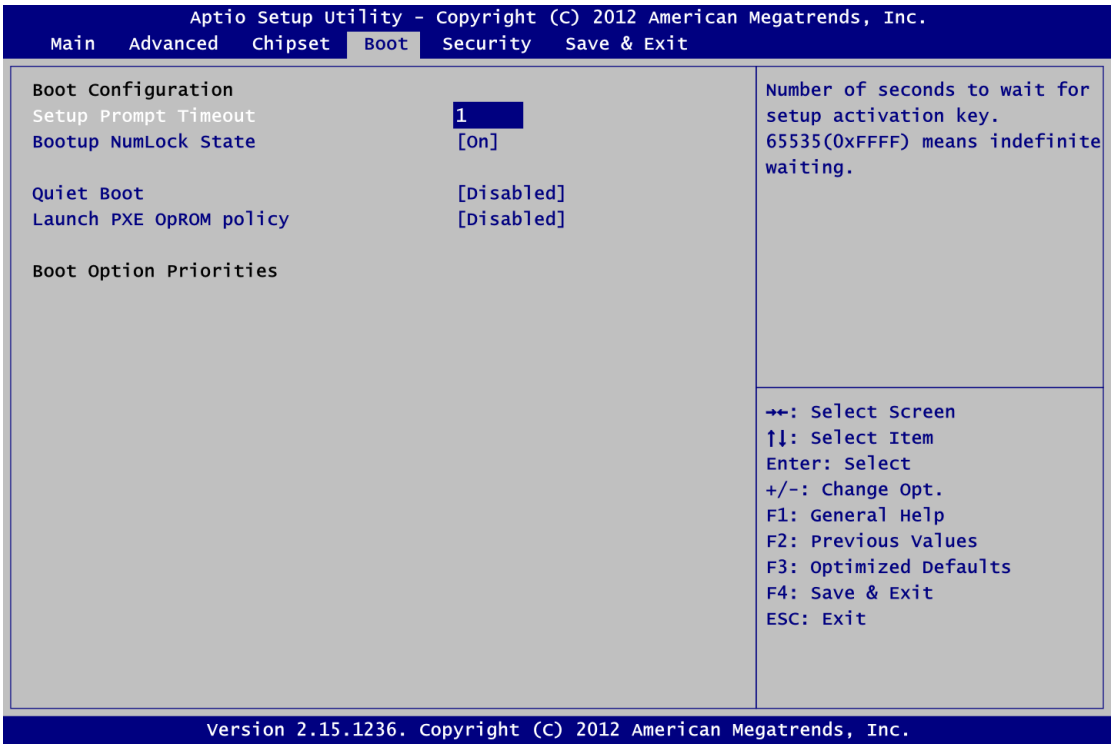
HD Audio Azalia Device
Control detection of the HD Audio device. Configuration options are Disabled and Enabled.

- **North Bridge Configuration**
  This screen shows the North Bridge configuration related information.



6.6 Boot Menu

The Boot menu allows users to change boot options of the system.



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

- **Bootup NumLock State**
  Use this item to select the power-on state for the keyboard NumLock.

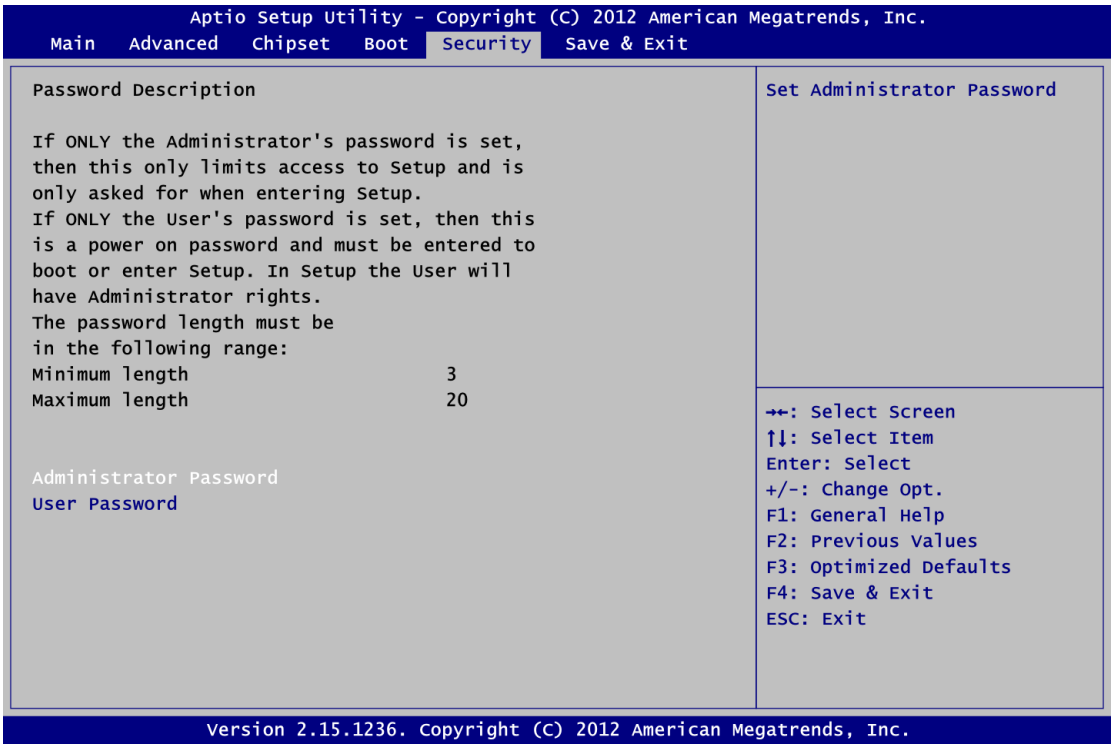
- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Launch PXE OpROM policy**
  Control the execution of UEFI and legacy PXE OpROM.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

6.7 Security Menu

The Security menu allows users to change the security settings for the system.

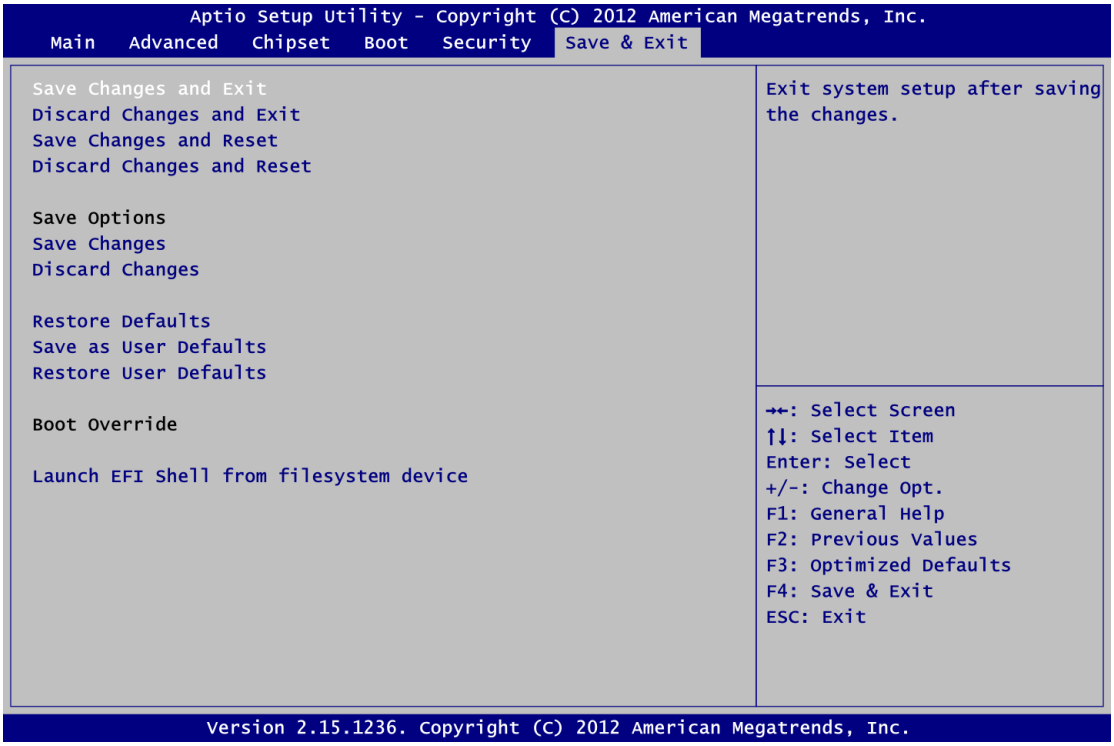

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

6.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

- **Launch EFI Shell from filesystem device**
  Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

This page is intentionally left blank.

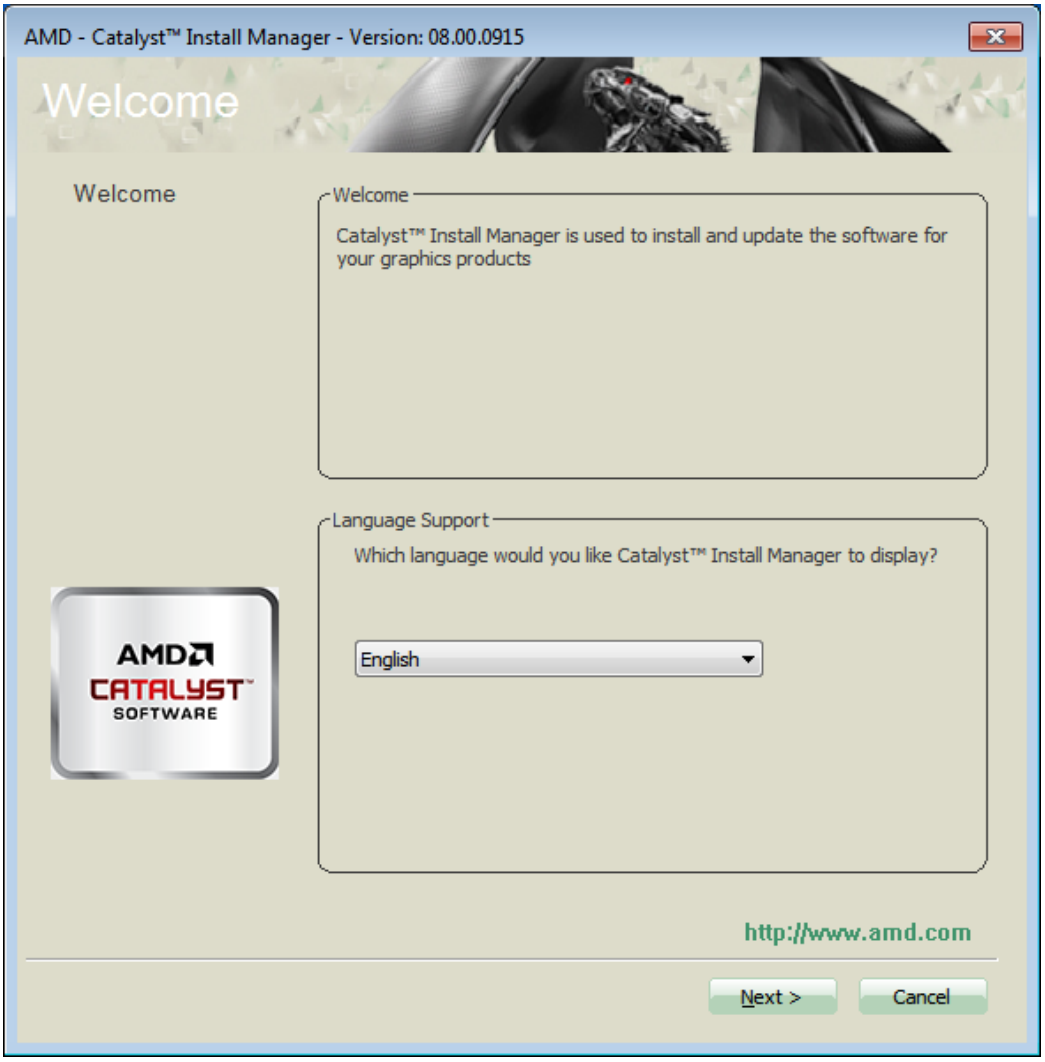
Chapter 7
Drivers Installation

The device drivers are located on the product information CD that comes with the PICO121 Series package. The auto-run function of drivers will guide you to install the utilities and device drivers under Windows® system. You can follow the onscreen instructions to install these devices:

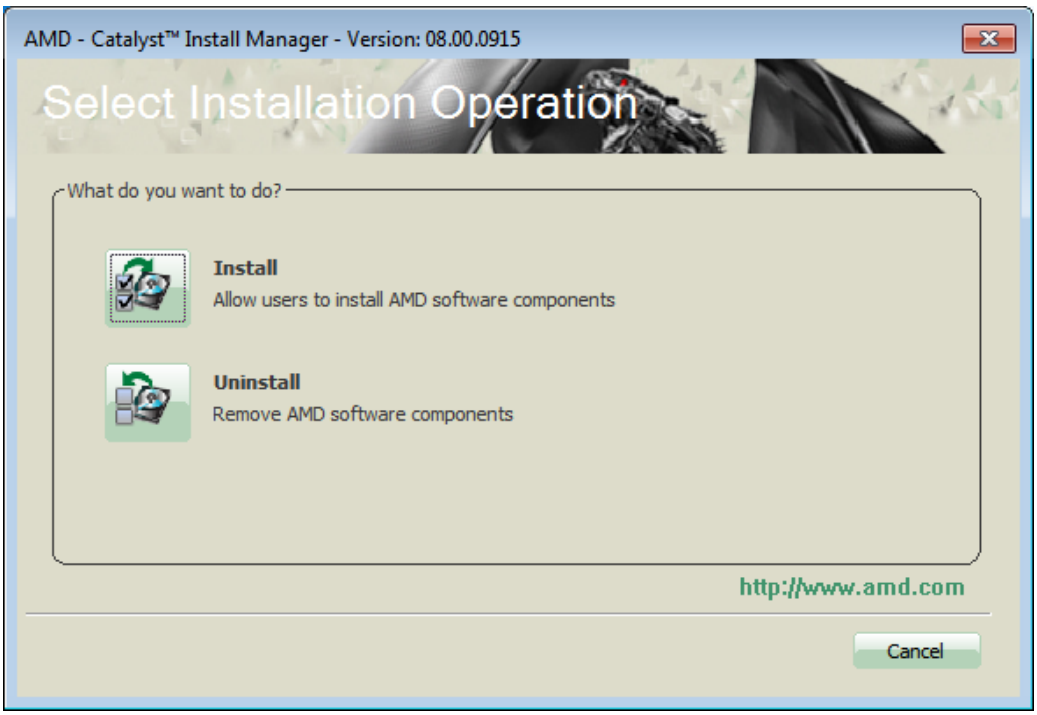
- Chipset
- Ethernet
- Audio

7.1 Installing Chipset Driver

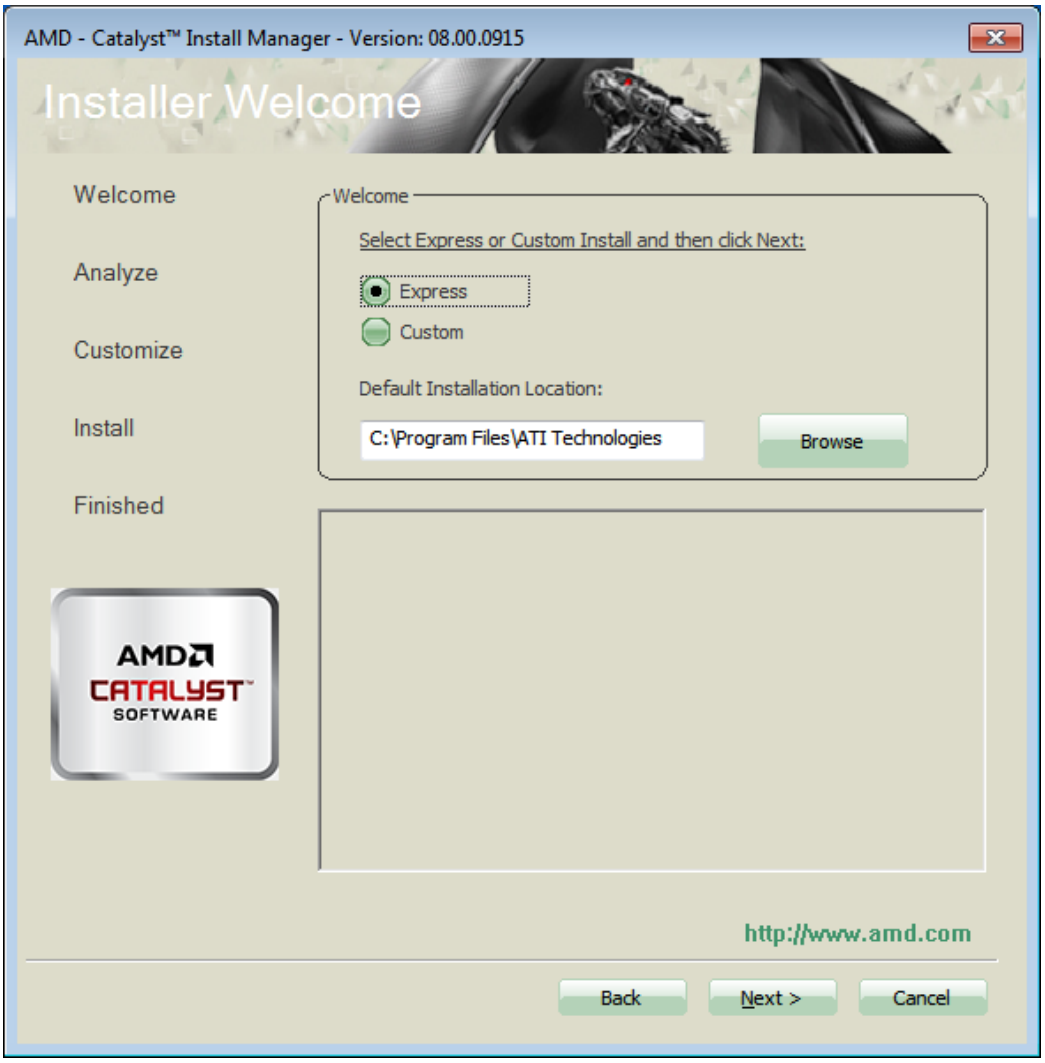
1. Run setup program from the driver directory in product information CD. Click “Next” to next step.



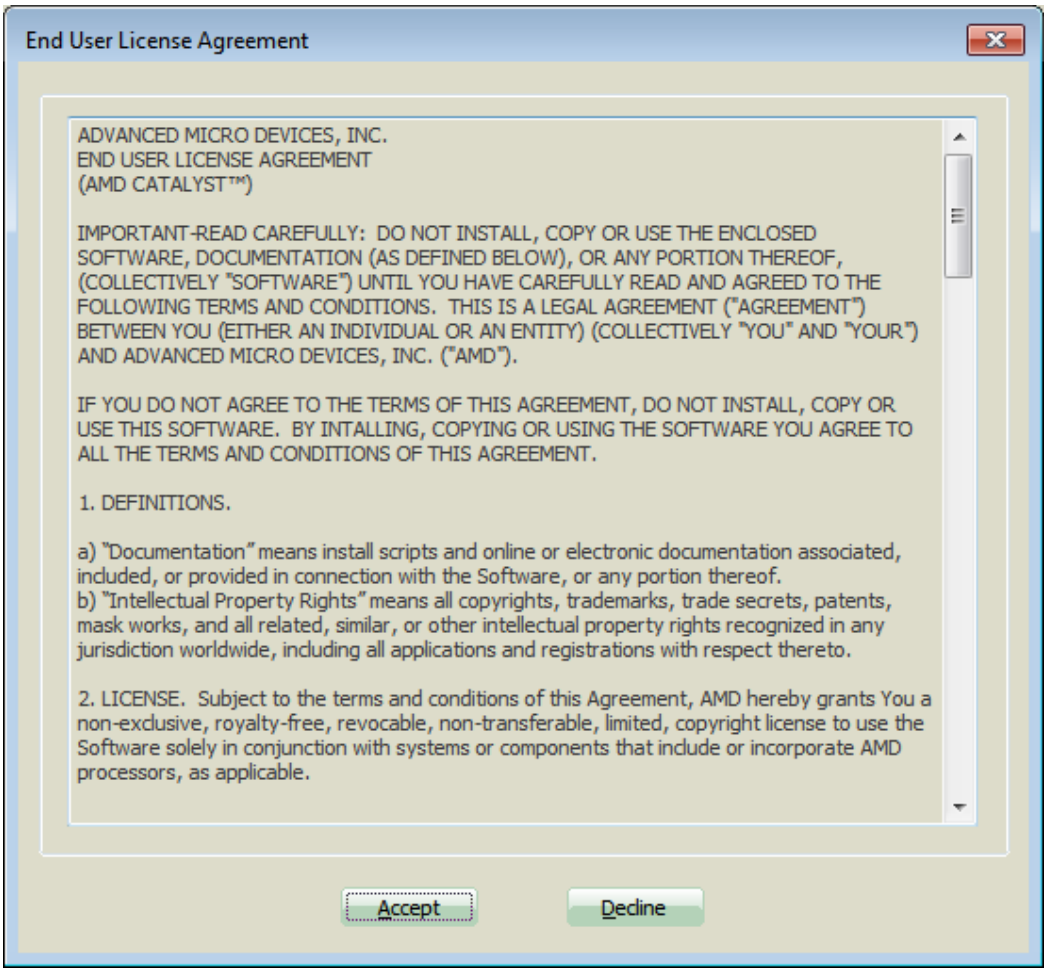
2. Click “Install” to allow users to install AMD software components.



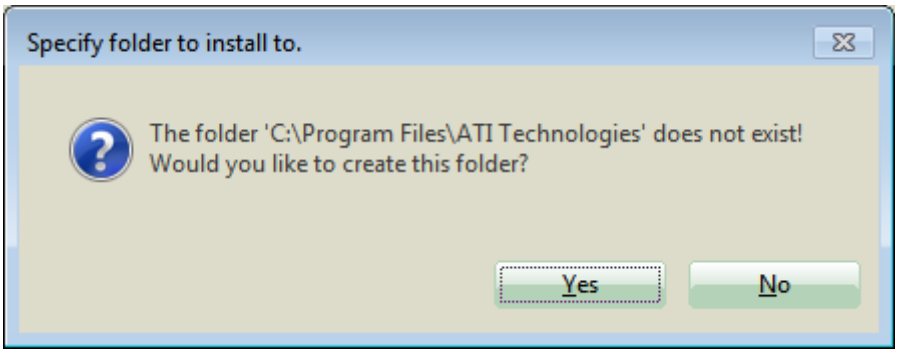
3. Select “Express” and you are suggested to use the default installation folder. Then click “Next” to continue.



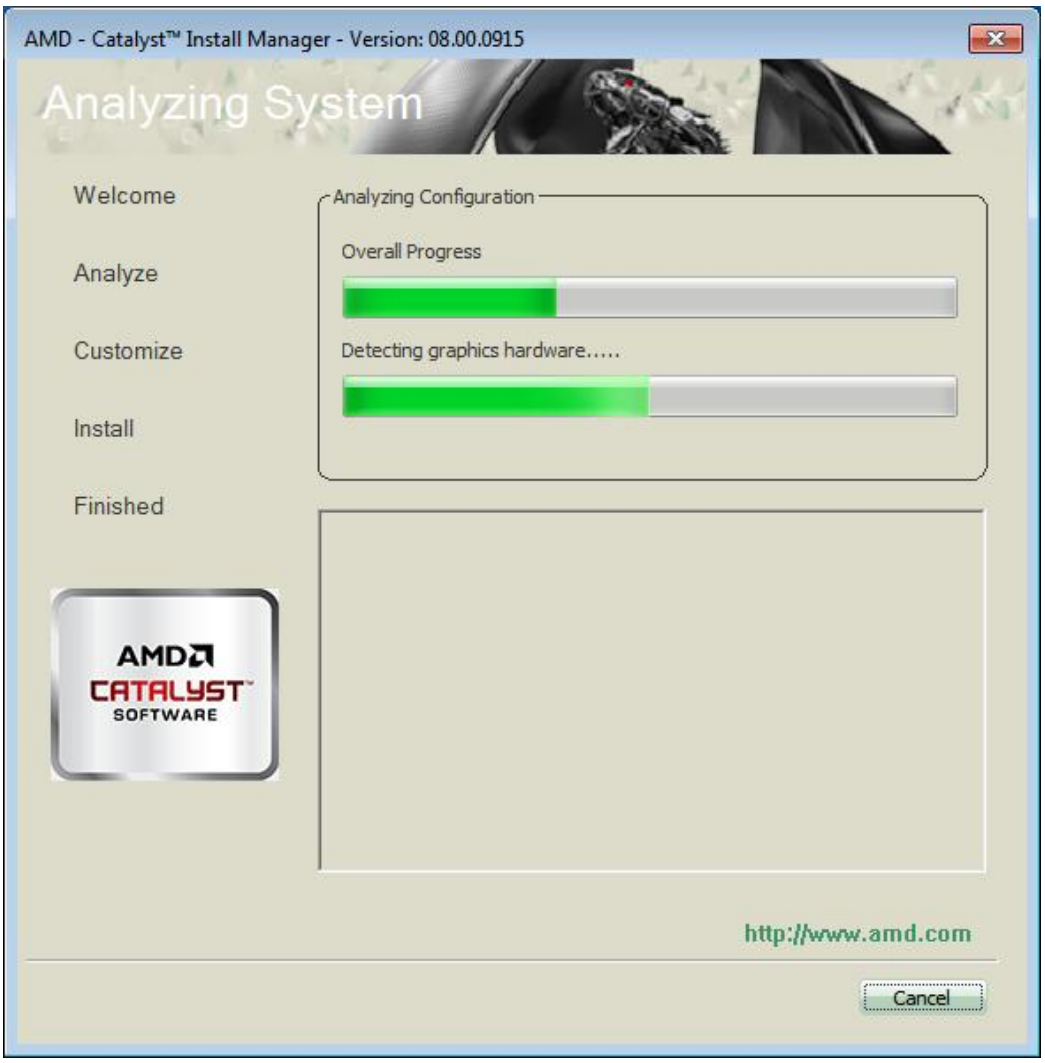
4. When End User License Agreement screen appears, please click “Accept” to next step.


End User License Agreement
ADVANCED MICRO DEVICES, INC.
END USER LICENSE AGREEMENT
(AMD CATALYST™)
IMPORTANT-READ CAREFULLY: DO NOT INSTALL, COPY OR USE THE ENCLOSED SOFTWARE, DOCUMENTATION (AS DEFINED BELOW), OR ANY PORTION THEREOF, (COLLECTIVELY "SOFTWARE") UNTIL YOU HAVE CAREFULLY READ AND AGREED TO THE FOLLOWING TERMS AND CONDITIONS. THIS IS A LEGAL AGREEMENT ("AGREEMENT") BETWEEN YOU (EITHER AN INDIVIDUAL OR AN ENTITY) (COLLECTIVELY "YOU" AND "YOUR") AND ADVANCED MICRO DEVICES, INC. ("AMD").
IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, DO NOT INSTALL, COPY OR USE THIS SOFTWARE. BY INTALLING, COPYING OR USING THE SOFTWARE YOU AGREE TO ALL THE TERMS AND CONDITIONS OF THIS AGREEMENT.
1. DEFINITIONS.
a) "Documentation" means install scripts and online or electronic documentation associated, included, or provided in connection with the Software, or any portion thereof.
b) "Intellectual Property Rights" means all copyrights, trademarks, trade secrets, patents, mask works, and all related, similar, or other intellectual property rights recognized in any jurisdiction worldwide, including all applications and registrations with respect thereto.
2. LICENSE. Subject to the terms and conditions of this Agreement, AMD hereby grants You a non-exclusive, royalty-free, revocable, non-transferable, limited, copyright license to use the Software solely in conjunction with systems or components that include or incorporate AMD processors, as applicable.
Accept
Decline

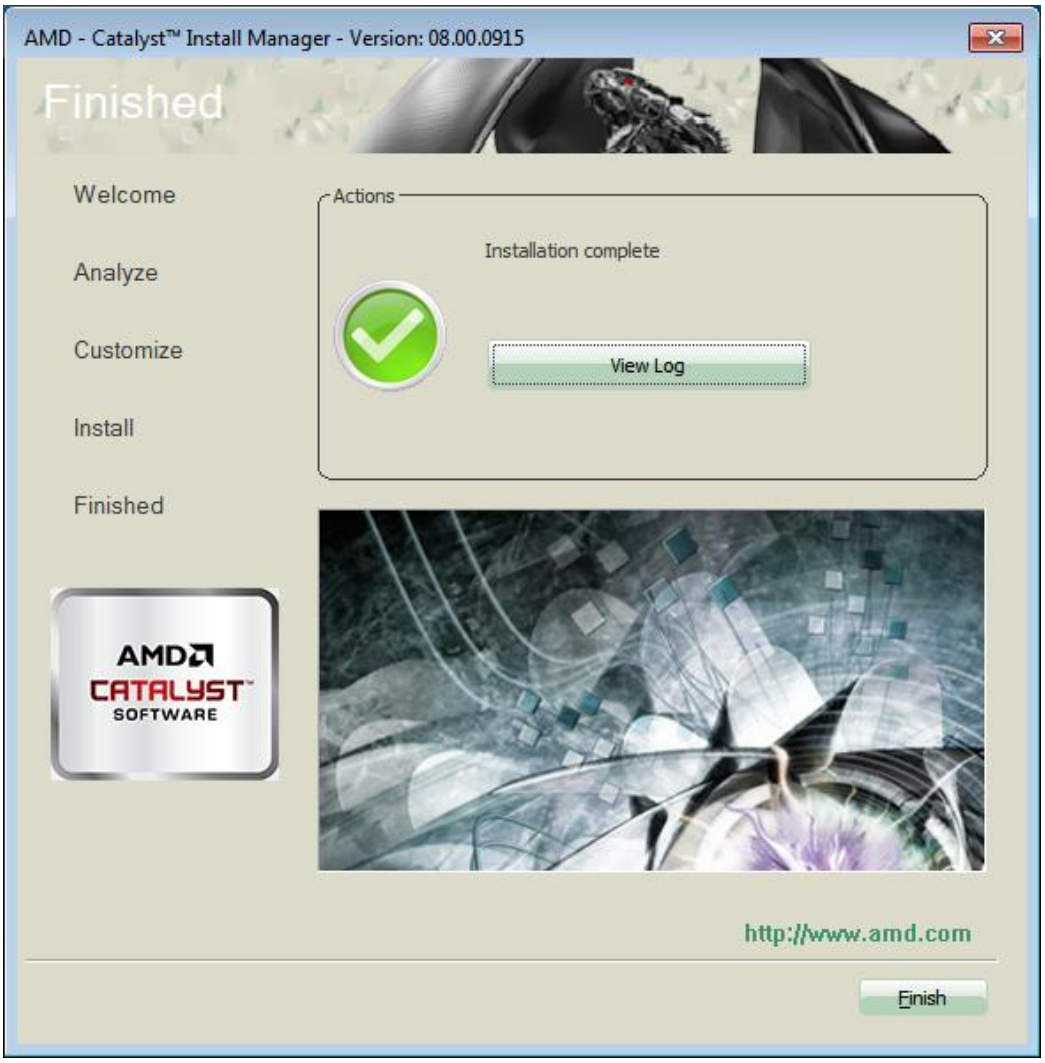
5. If the installation folder name does not exist, the following screen pops up. Click “Yes” to create a new folder.


Specify folder to install to.
The folder 'C:\Program Files\ATI Technologies' does not exist!
Would you like to create this folder?
Yes
No

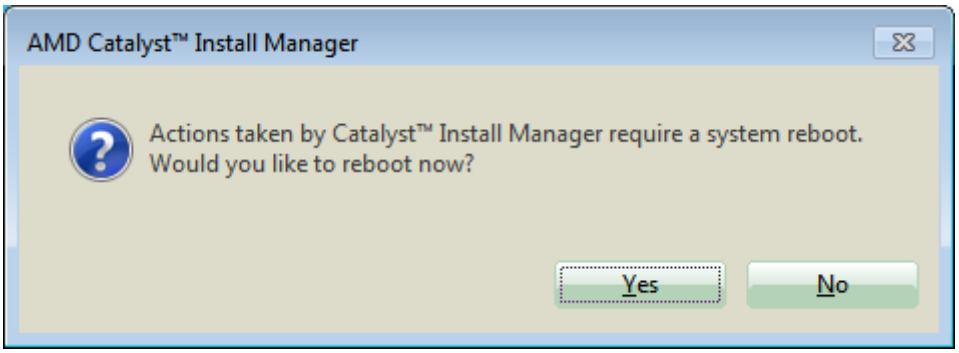
6. Please wait while setup processes the analyzing operations.



7. Wait till the following screen appears, click “Finish” to continue.

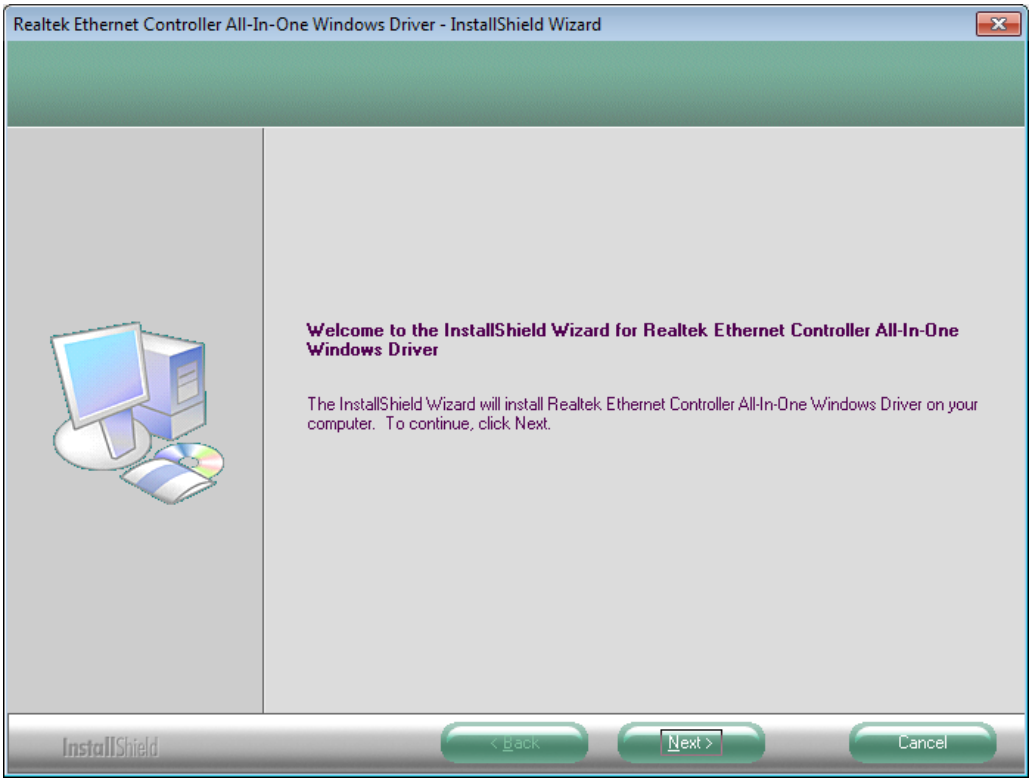


8. Click “Yes” to complete the setup process and reboot.

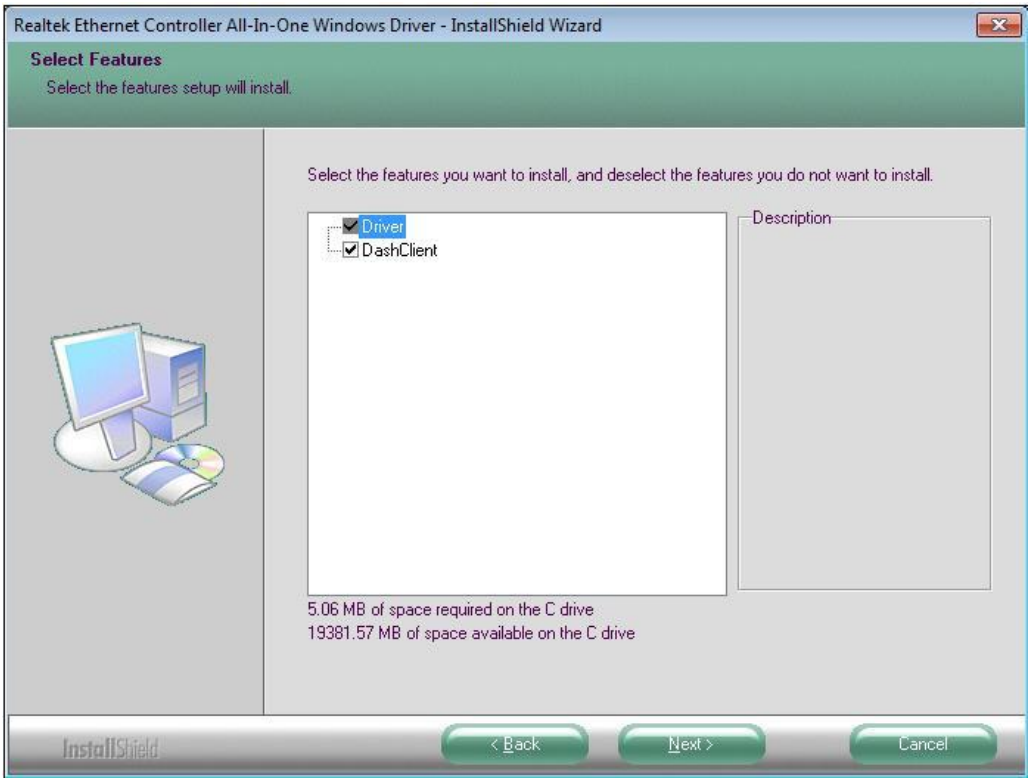

AMD Catalyst™ Install Manager
Actions taken by Catalyst™ Install Manager require a system reboot.
Would you like to reboot now?
Yes
No

7.2 Installing Ethernet Driver

1. Run setup program from the driver directory in product information CD. Click “Next” to continue.


Realtek Ethernet Controller All-In-One Windows Driver - InstallShield Wizard
Welcome to the InstallShield Wizard for Realtek Ethernet Controller All-In-One Windows Driver
The InstallShield Wizard will install Realtek Ethernet Controller All-In-One Windows Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

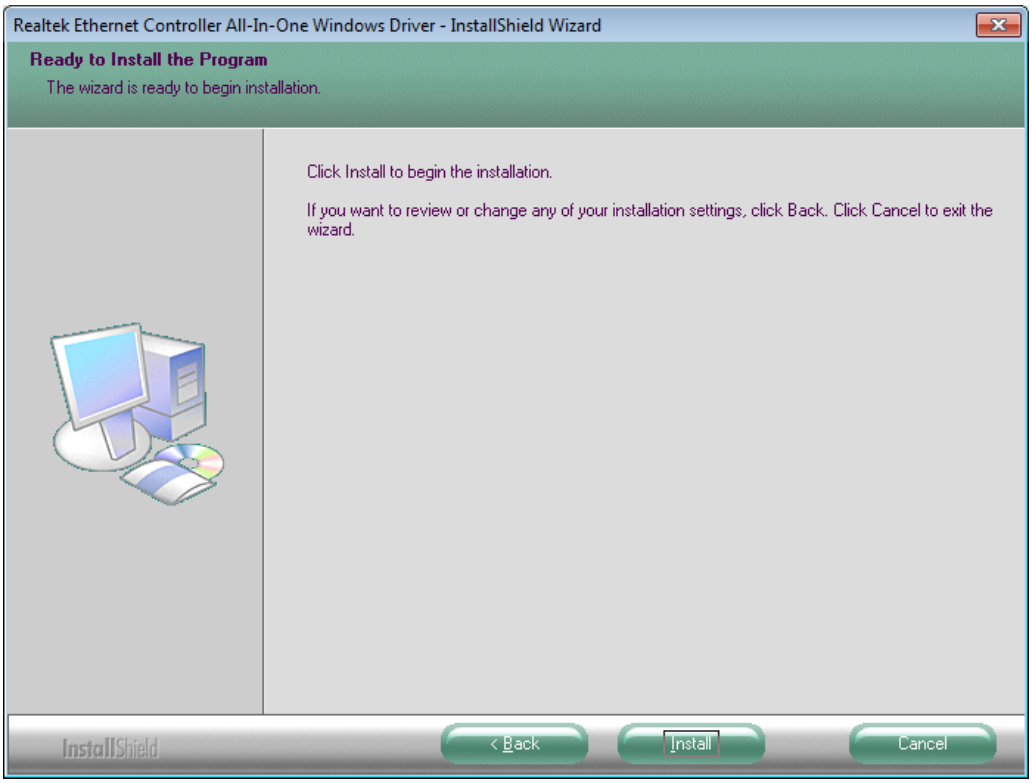
2. When the following screen appears, select the features you want to install. Click “Next” to continue.


Realtek Ethernet Controller All-In-One Windows Driver - InstallShield Wizard
Select Features
Select the features setup will install.
Select the features you want to install, and deselect the features you do not want to install.
Driver
DashClient
Description
5.06 MB of space required on the C drive
19381.57 MB of space available on the C drive
InstallShield
< Back
Next >
Cancel

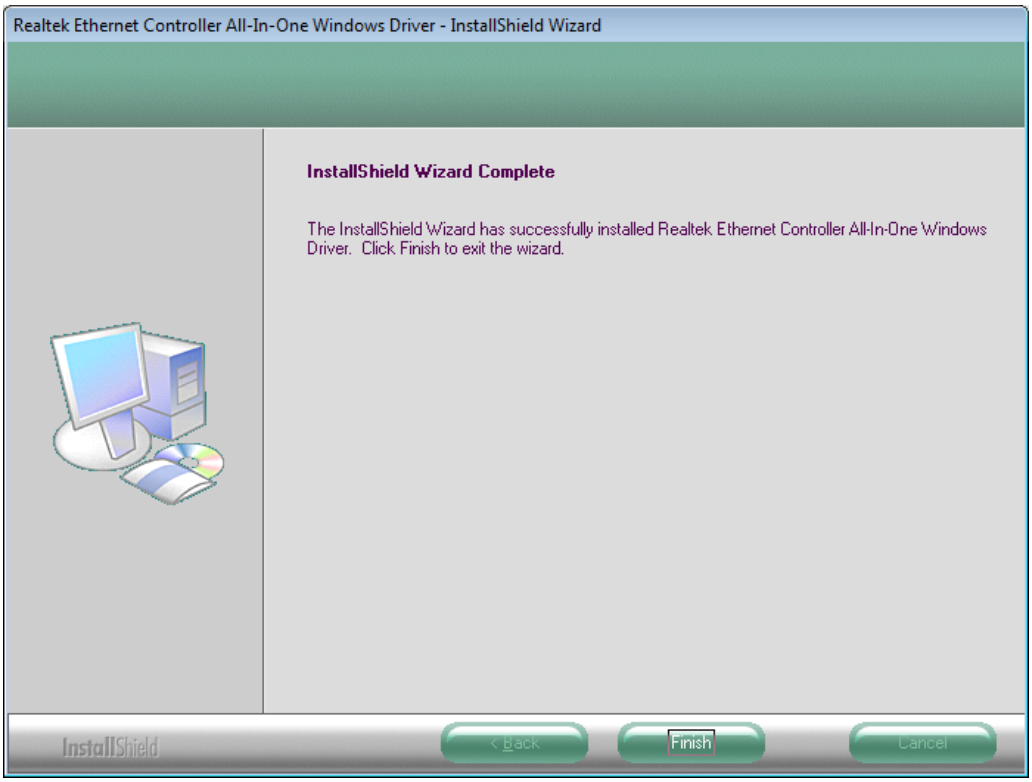
Note

In order to support DASH implementation, you must select the DashClient feature within Select Features screen.

3. Now setup wizard is ready. Click “Install” to begin the installation.

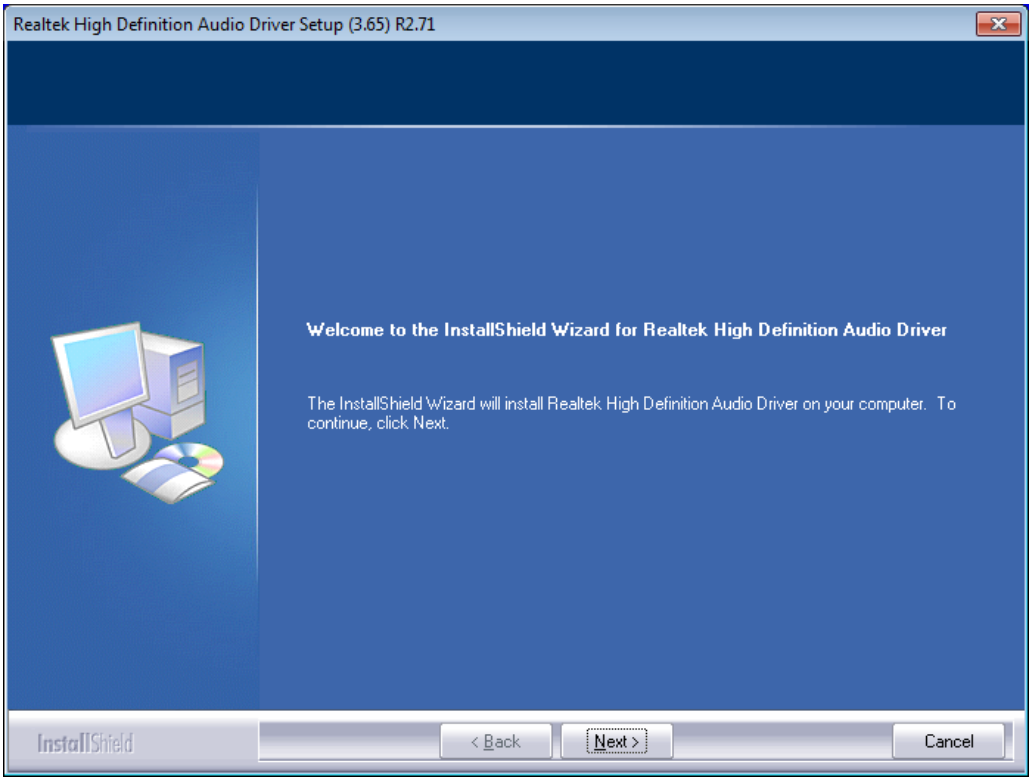

Realtek Ethernet Controller All-In-One Windows Driver - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

4. Please wait while setup processes the installation operations. When driver installation is complete, the following screen appears. Click “Finish” to exit.

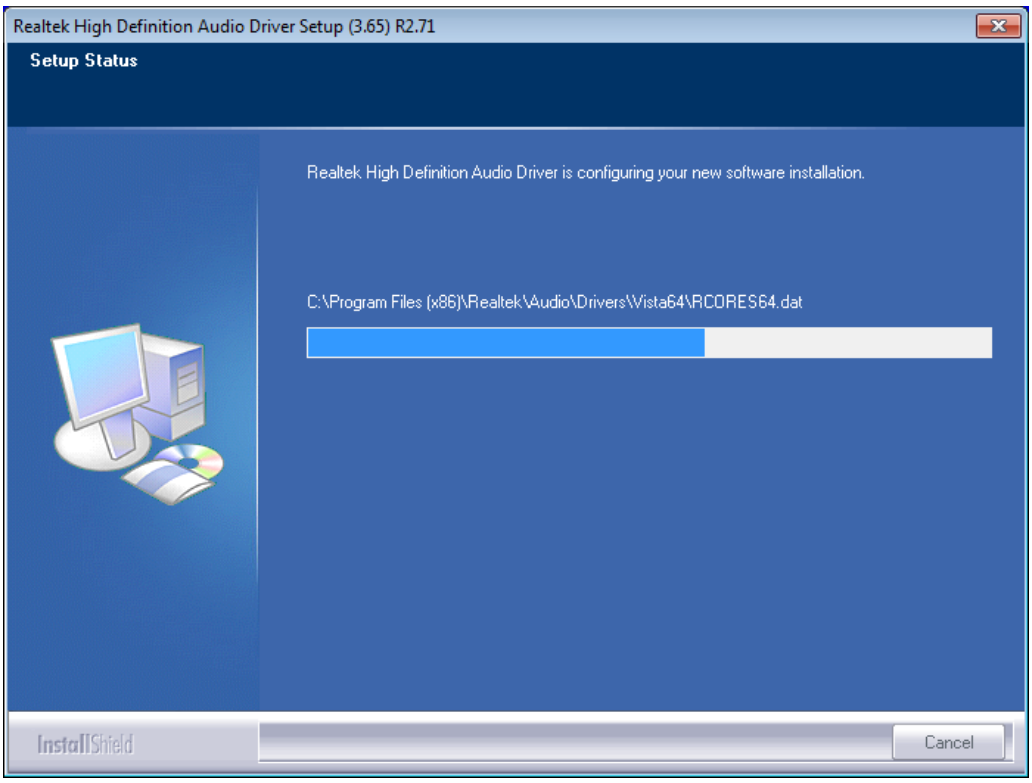

Realtek Ethernet Controller All-In-One Windows Driver - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Realtek Ethernet Controller All-In-One Windows Driver. Click Finish to exit the wizard.
InstallShield
< Back
Finish
Cancel

7.3 Installing Audio Driver

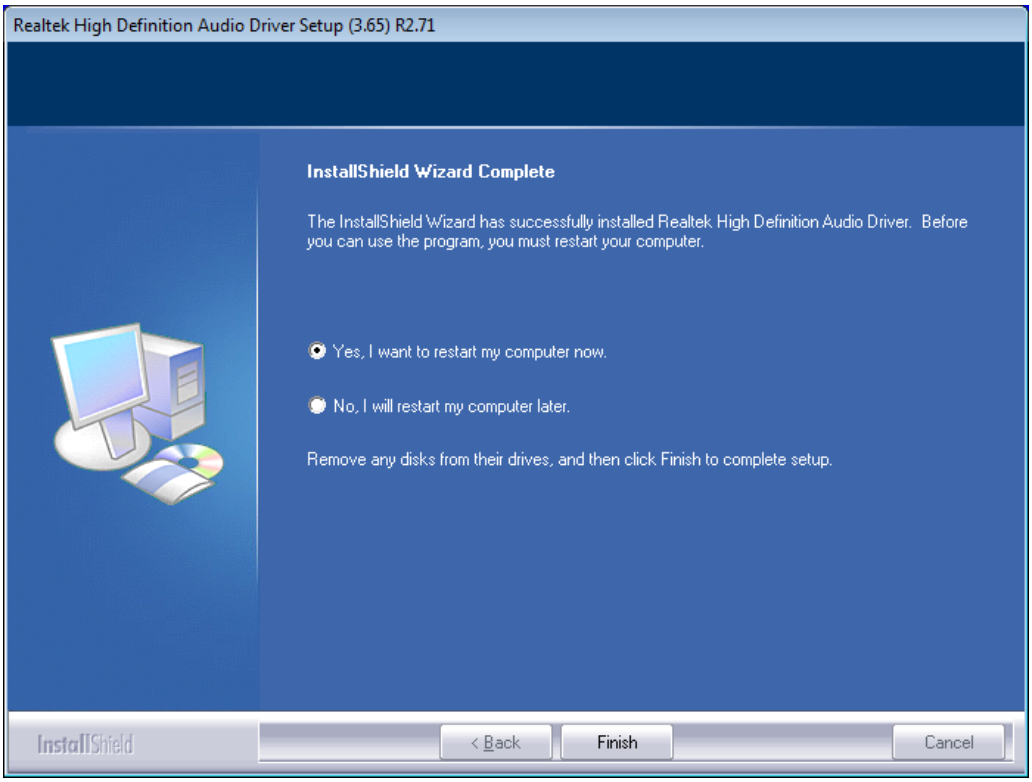
1. Run the setup.exe for audio from driver directory in product information CD. Click “Next” to continue.


Realtek High Definition Audio Driver Setup (3.65) R2.71
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

2. Please wait while driver configures your new software installation.


Realtek High Definition Audio Driver Setup (3.65) R2.71
Setup Status
Realtek High Definition Audio Driver is configuring your new software installation.
C:\Program Files (x86)\Realtek\Audio\Drivers\Vista64\RCORES64.dat
InstallShield
Cancel

3. You are suggested to select “Yes, I want to restart my computer now”. Click “Finish” to complete the setup process and restart computer.


Realtek High Definition Audio Driver Setup (3.65) R2.71
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Realtek High Definition Audio Driver. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

This page is intentionally left blank.

Chapter 8
DASH User Guide

8.1 Client Side

8.1.1 BIOS Settings

Please check the PXE remote boot is enabled as Figure 1 before you use this agent. During the late of BIOS POST, you can press <Shift + F10> to launch this agent as Figure 2(a). You need to supply a valid login username and password pair for authentication. The default account name is **Administrator** with the corresponding password **Axiomtek** as Figure 2(b). After successful authentication, you can change the network settings along with the account information. Figure 3 shows the screen shoot of the agent. Please press <F4> to save the changes whenever you want to modify settings and reboot.

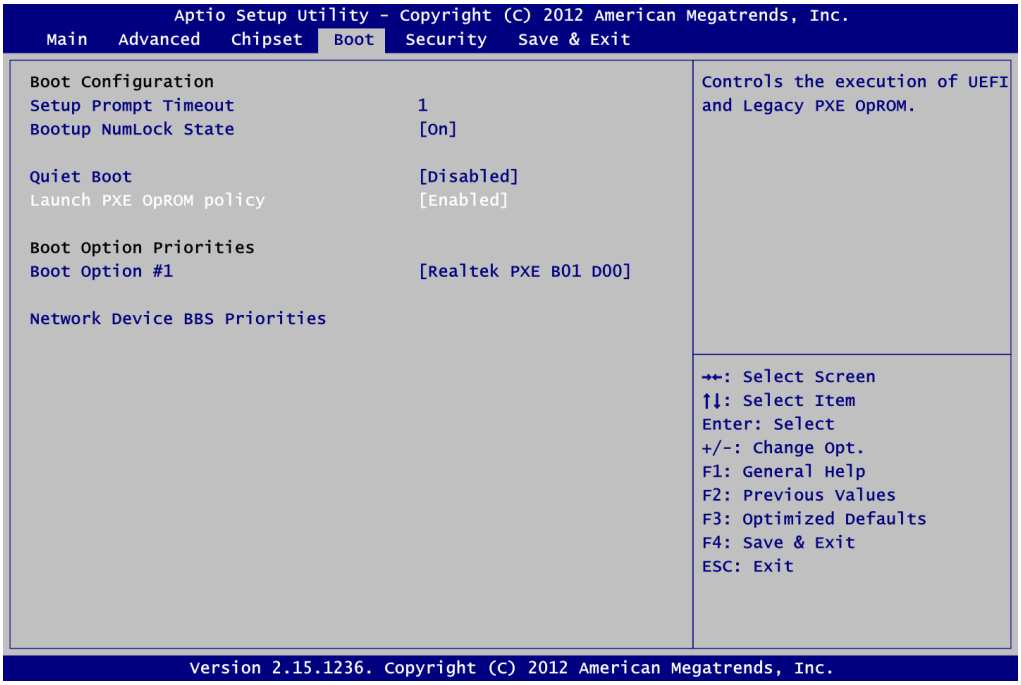


Figure 1: Boot Menu

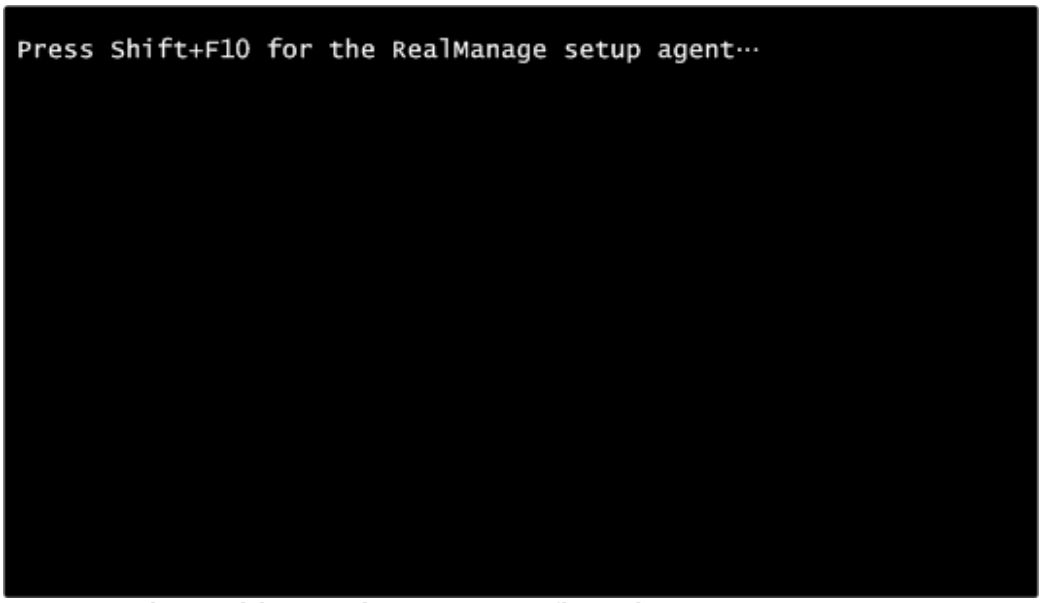


Figure 2(a): Enter into DASH Configuration Setup Agent

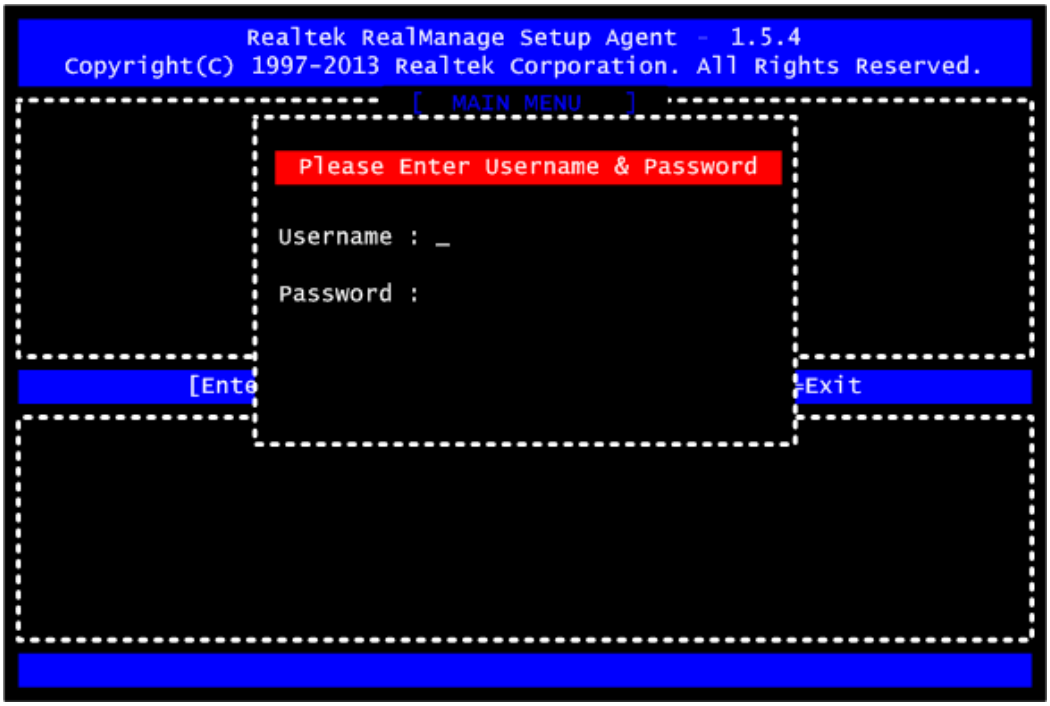


Figure 2(b): Login to Setup Agent

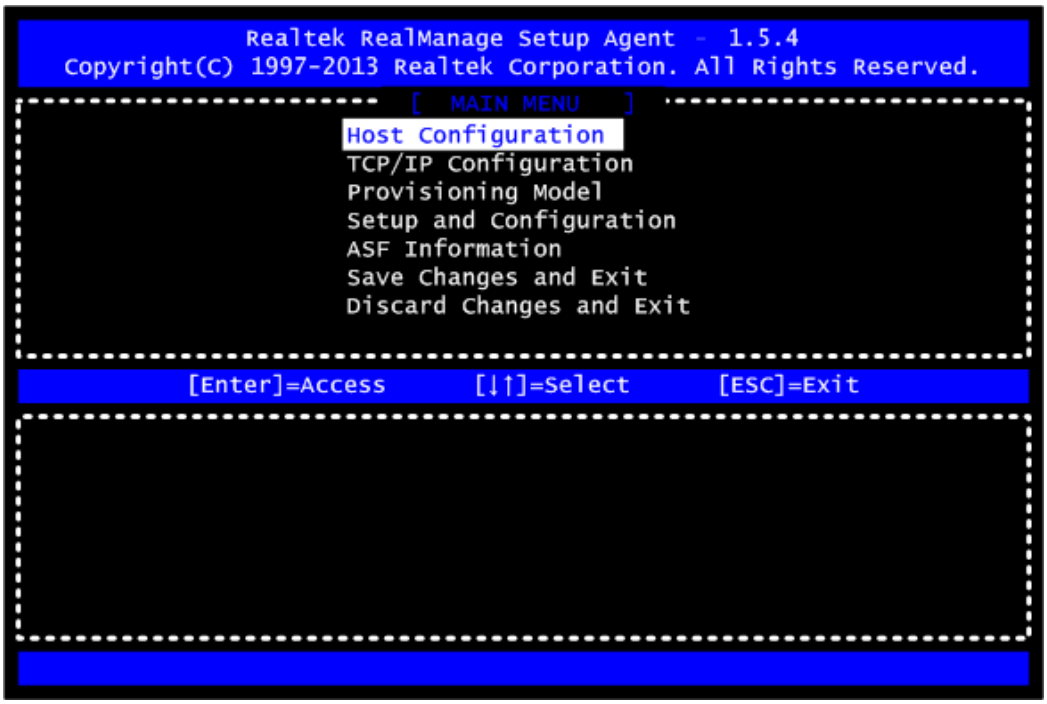


Figure 3: Active DASH Configuration Setup Agent

Please enable **MTCP support** and **ASF support** in the Advanced\DASH Setting as Figure 4(a), (b). Without these settings, firmware cannot perform remote control operations and PLDM transfers through SMBus.

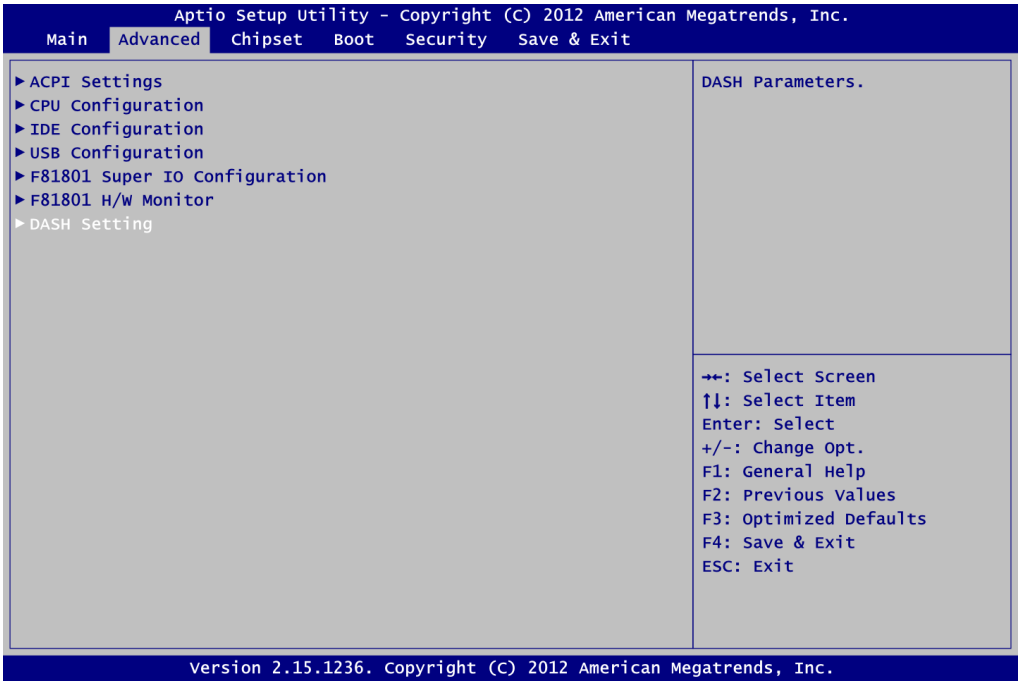


Figure 4(a): Advanced Tab within BIOS

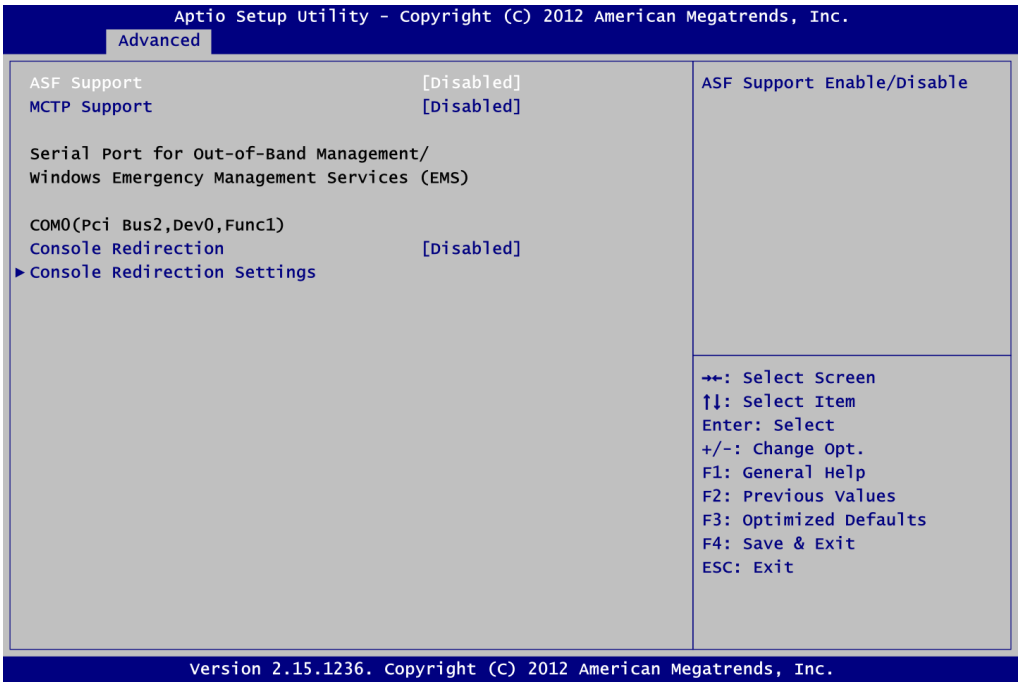


Figure 4(b): DASH Setting

After pressing Console Redirection Settings, please follow the settings shown in Figure 5 for best performance and compatibility.

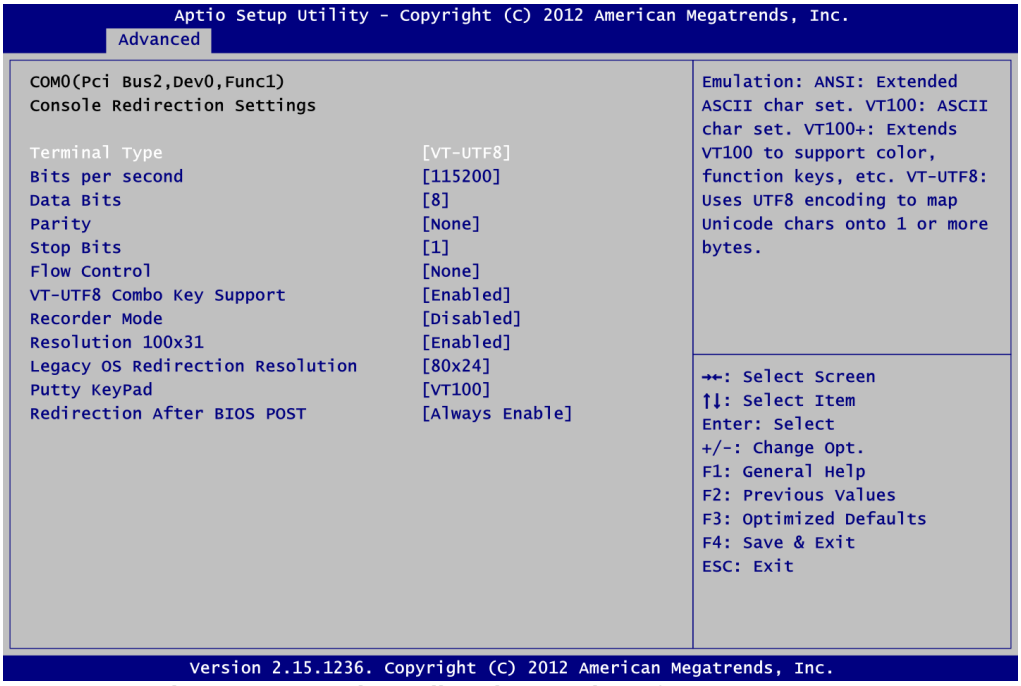

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
COM0(Pci Bus2,Dev0,Func1)
Console Redirection Settings
Terminal Type [VT-UTF8]
Bits per second [115200]
Data Bits [8]
Parity [None]
Stop Bits [1]
Flow Control [None]
VT-UTF8 Combo Key Support [Enabled]
Recorder Mode [Disabled]
Resolution 100x31 [Enabled]
Legacy OS Redirection Resolution [80x24]
Putty KeyPad [VT100]
Redirection After BIOS POST [Always Enable]
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Figure 5: Console Redirection Settings for AMI BIOS

8.1.2 Software Installation

After setting BIOS as section 8.1.1 shown and installing OS, such as Windows® 7 or Windows® 8, when you install Ethernet driver, please check **DashClient** (see section 7.2). Then it turns the device into a DASH enabled computer on the client side. You can use a console device with Realtek Management Console installed to control and monitor a remote DASH enabled computer (see section 8.2.1).

8.2 Console Side

8.2.1 Management Console Tool

Please install **Realtek Management Console** under Windows® Vista or Windows® with version above Vista, such as Windows® 7 and Windows® Server 2008.

- **Discovery**

You can use **Discovery** page to find computers capable of ASF or DASH. In the discovery phase, you can find ASF or DASH manageable computers by giving a range of IP addresses along with port lists and protocols specified. When computers are found, they would be shown in the window. By double clicking the found IP, a Manageability page would appear. Figure 6 shows the results when finding a range of computers from 192.168.0.1 to 192.168.0.255. In addition to the current found devices, computers ever discovered are also listed in the left pane of the window.

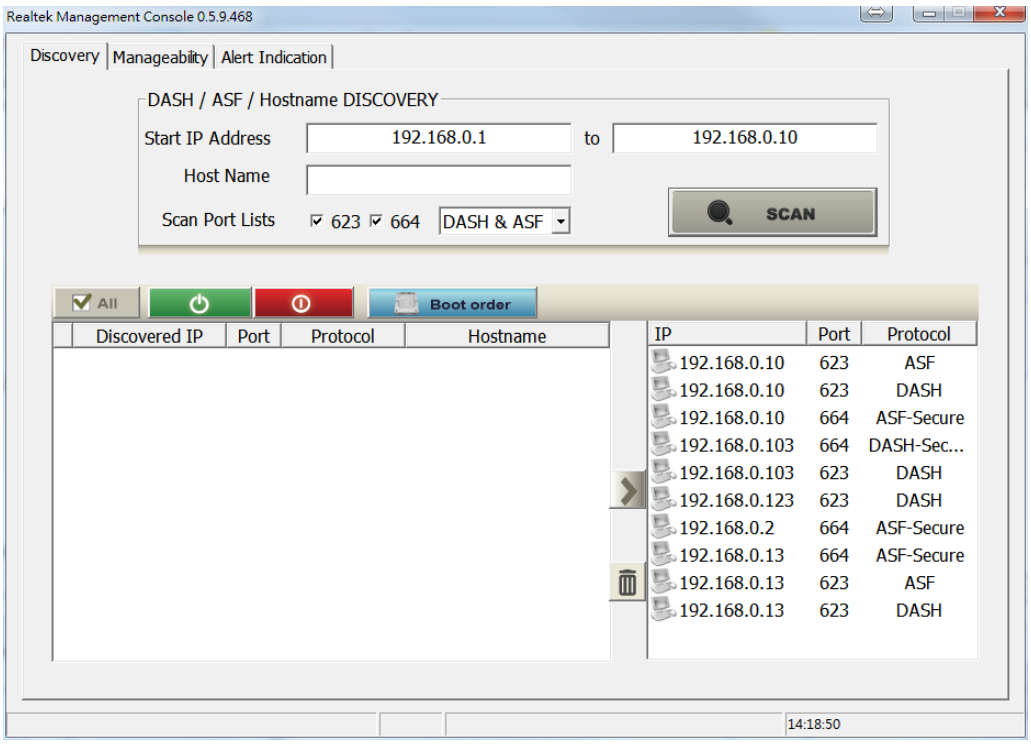


Figure 6: Discover Manageable Devices

- **Manageability**

In **Manageability** page, you can manually set the IP address and the port number associated with a specific DASH enabled computer. Another alternative is to use the found IP address and port number, which would be automatically filled into corresponding fields whenever you have completed the discovery phase. Please use **Administrator** as user name and **Axiomtek** as password to login. After successful login, a new pop-out window with all supported profiles would appear, such as shown in Figure 7.

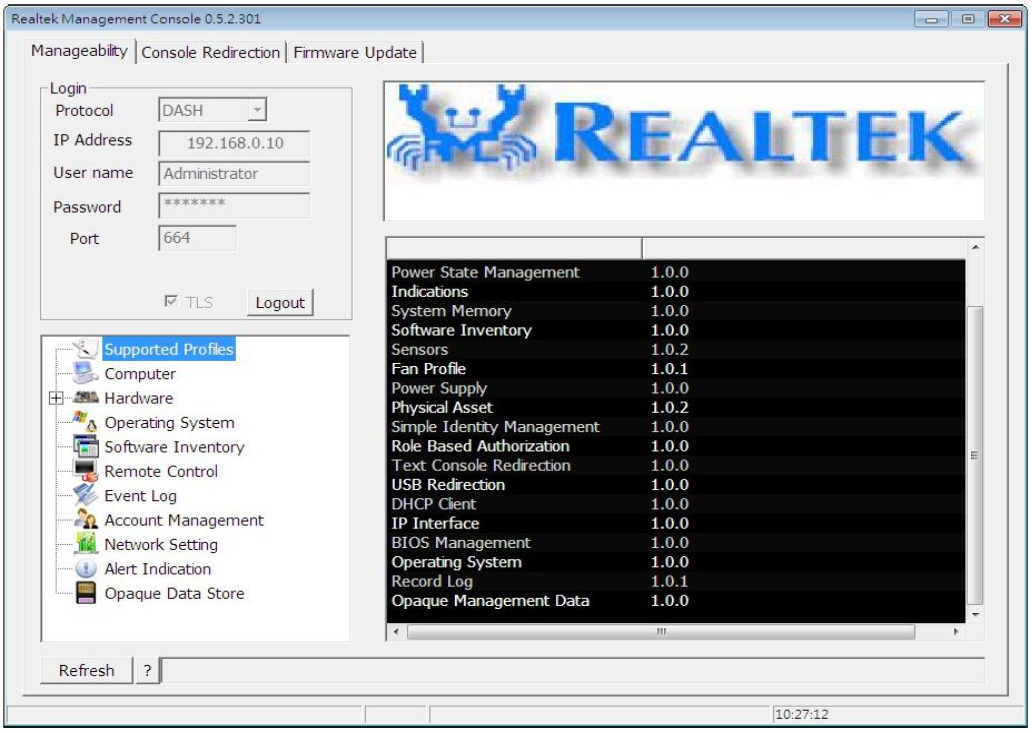


Figure 7: Registered Profiles

- **Remote Control**

In the **Remote Control** node within **Manageability** page, you can **power on**, **power off**, **power reset**, or **power recycle** the DASH capable computer. You can use the check box to specify the boot device during next booting. Currently this feature is based on **PLDM for BIOS Control and Configuration Specification** and the system needs at least a one-time boot before you could get attached bootable devices. Figure 8 shows the snap shot of this feature.

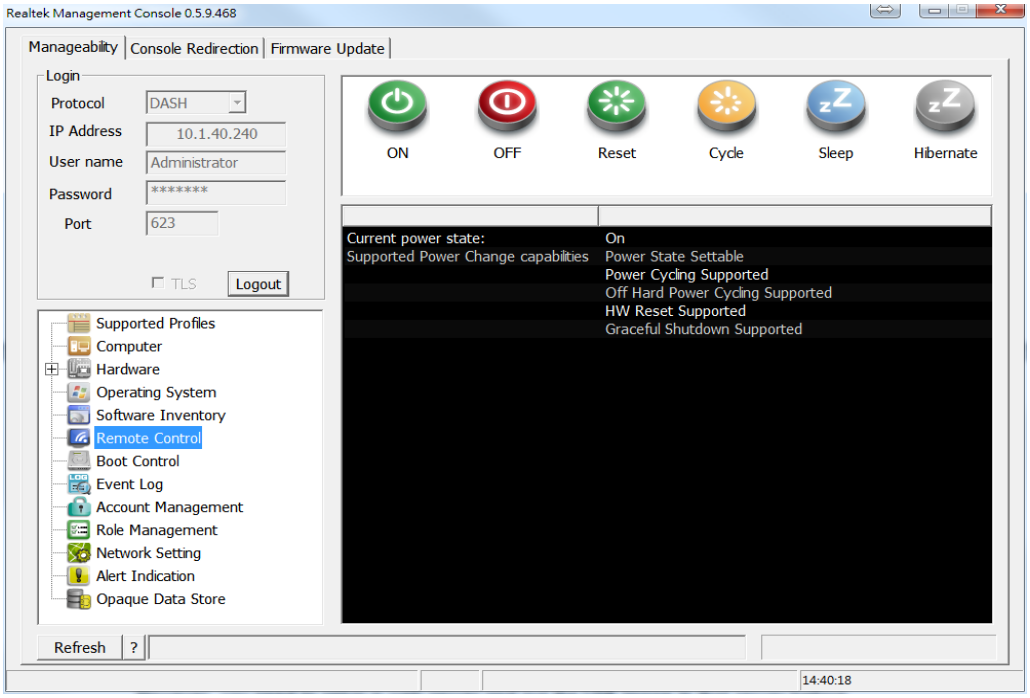


Figure 8: Remote Control and Boot Device Order Change

- **Console Redirection**

The DASH on PICO121 supports two redirection services, text console redirection and USB redirection services. These two features can be found in the **Console Redirection** tab, such as shown in Figure 9.

For USB redirection, users can redirect a pre-created image, CD-ROM drive, USB dongle and floppy from a remote console as if the device is plugged within the client computer. You can use the check box to choose an image file (U**sing image file**) or a physical drive (U**sing true device)** for redirection. By pressing the "…" button, you must specify the file name or the drive letter used for redirection before starting redirection service. Besides, except for CD-ROM drive redirection, USB redirection also implements write operations, which means you can write data from the client side back to the console side. Moreover, you can check the **Using URL** and provide a valid URL to do the same thing. However, you need to setup a web server and put the USB image in that server before enabling the USB redirection service. Only read operations are supported. If write operations are needed, please consider using image file or true device.

Text console redirection has the ability to directly enter BIOS setup or pop out a BBS screen without user's pressing any key during the booting time. This can reduce the effort for users when they want to enter BIOS setup or just temporary change boot device. Whenever a new option is chosen (**Normal Boot**, **Enter BIOS Setup**, and **Enter BBS Popout**), you should press the **Stop TCR** button first and then press the **Start TCR** button to get it work correctly.

After **Start TCR** button is pressed, the remote control function would also be invoked, according to the selected check box in the **After Rebooting** field. This means that you can do text console redirection right now without doing any remote operation, or do it the next time when the computer boots.

Both **TELNET** and **SSH** protocols are supported. You can choose to use either of them according to your need.

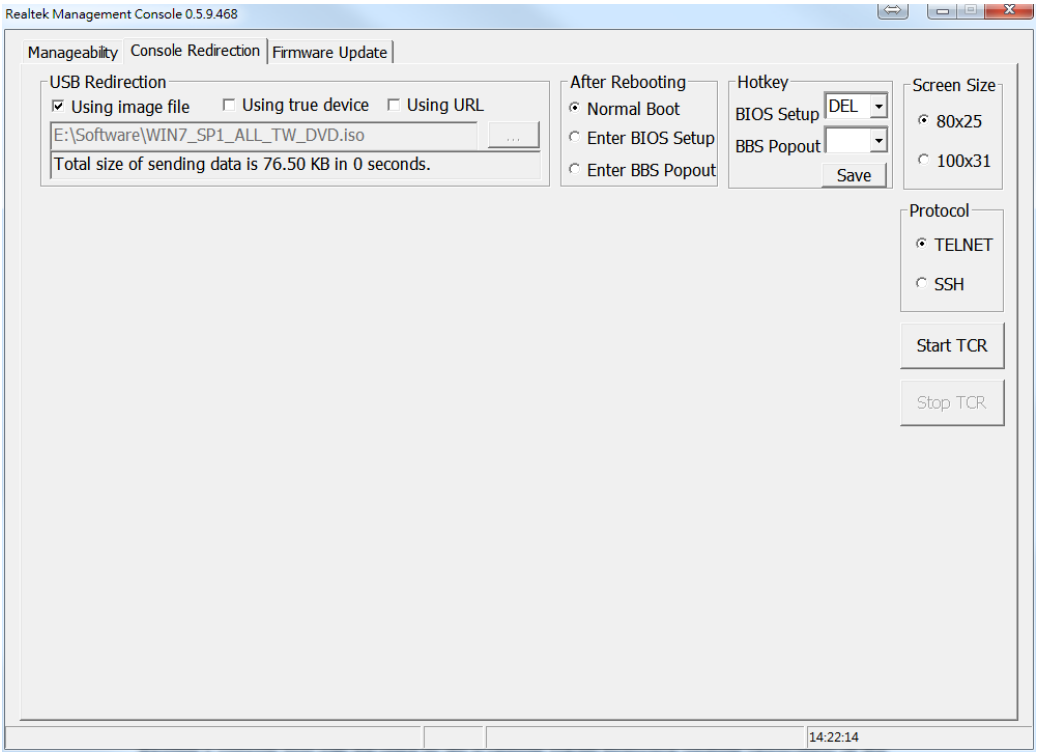


Figure 9: Redirection Services

- **Firmware Update**

This console tool can be used to do a remote DASH firmware update regardless of the power state. This means that even in the S5 state (without any operating system), we can do a firmware update process. Click "…" to browse a new firmware file, and then click **Start Update** to begin the firmware update process, such as shown in Figure 10.

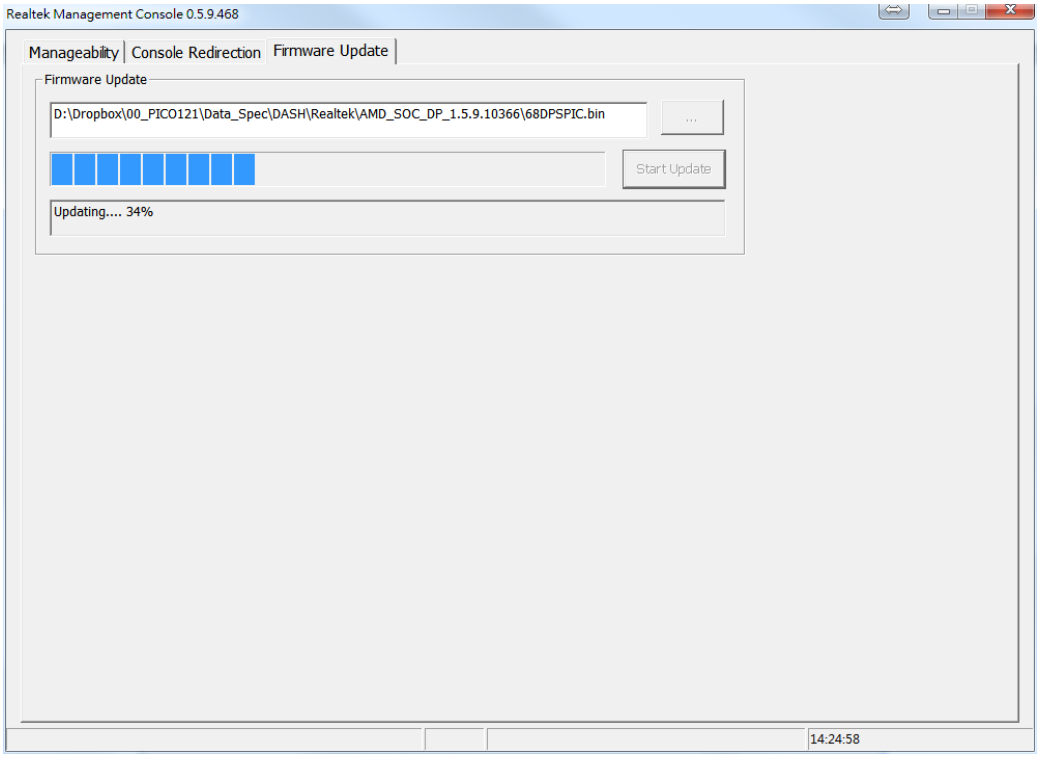


Figure 10: Firmware Update

8.2.2 Built-in Web Server

It also has a built-in web server with HTTP and HTTPS (TLS). The default port for HTTP is 623 while that for HTTPS is 664. You can login the web server to perform some simple management functions, such as basic hardware information query, remote control, event log browsing and network settings. Figure 11 shows the snap shot of the built-in web server.

Ex: http://10.1.40.240:623

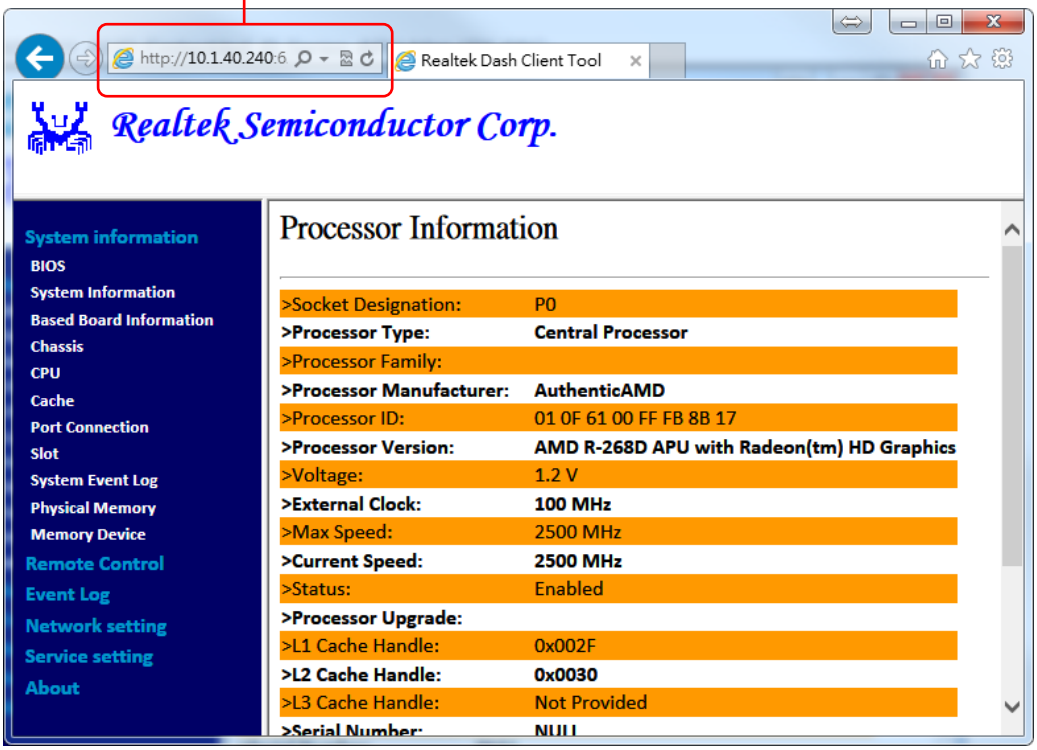


Figure 11: Built-in Web Server

Appendix A
AX93278 I/O Board (Optional)

The AX93278 is an I/O expansion board which is suggested to insert carefully into CN4 and CN5 on PICO121. Its specifications and detailed information are given in this Appendix.

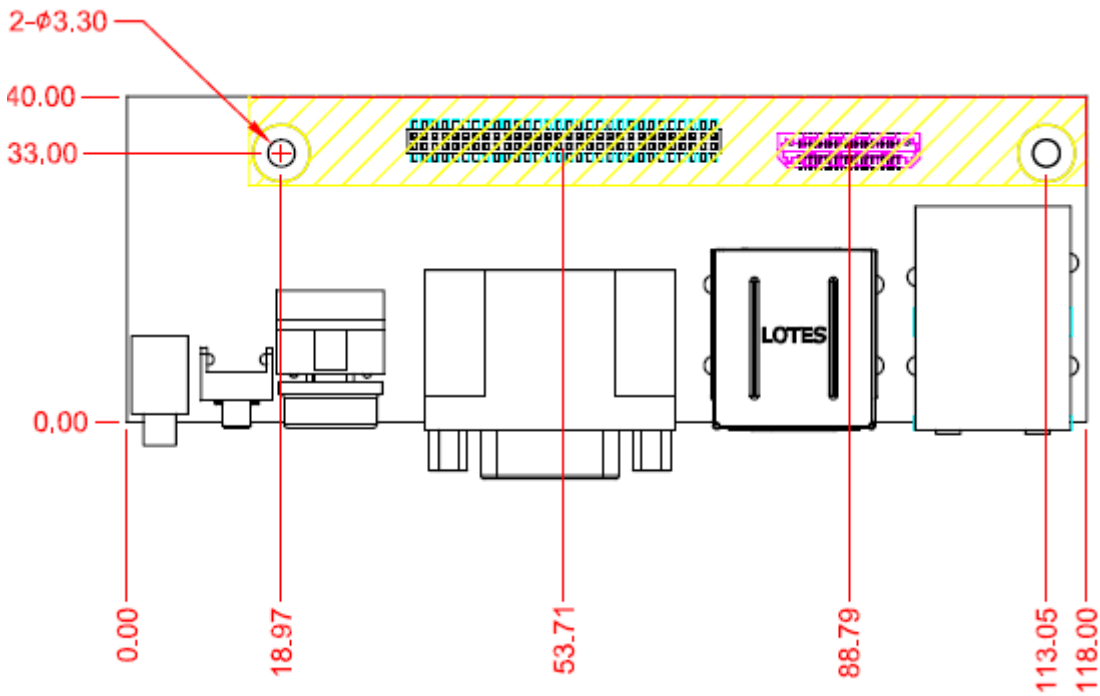
A.1 AX93278 Specifications

- **Size**
  - 118mm x 40mm

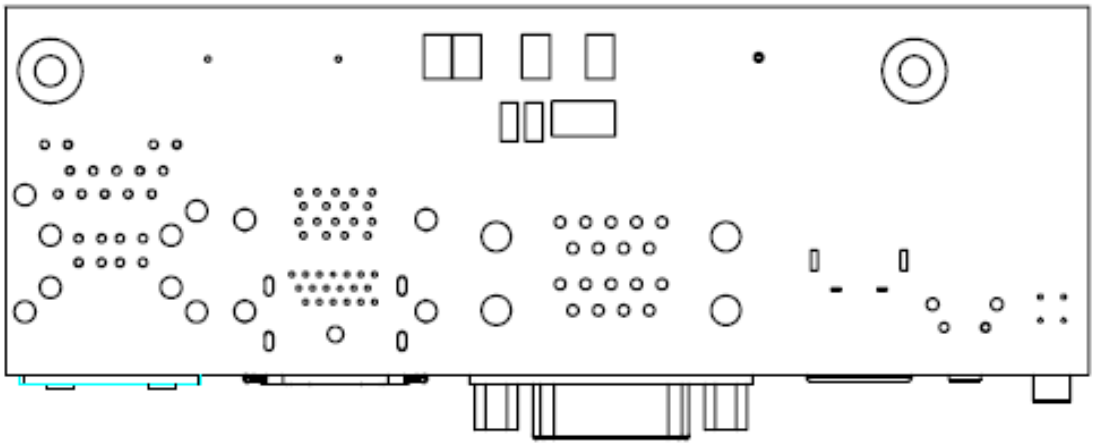
- **Features**
  - One HDMI.
  - One RJ-45 Ethernet port.
  - Two USB 2.0.
  - Two USB 3.0.
  - One 2x5-pin box header for MIC-in and line-out.
  - Serial Ports: One port for RS-232/422/485 and one port for RS-232.
  - Power-on, reset and red/green LED.

Note ***All specifications and images are subject to change without notice.***

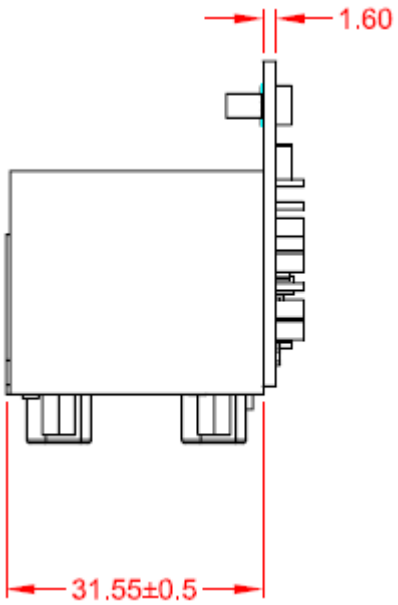
A.2 AX93278 Dimensions and Fixing Holes



Top View

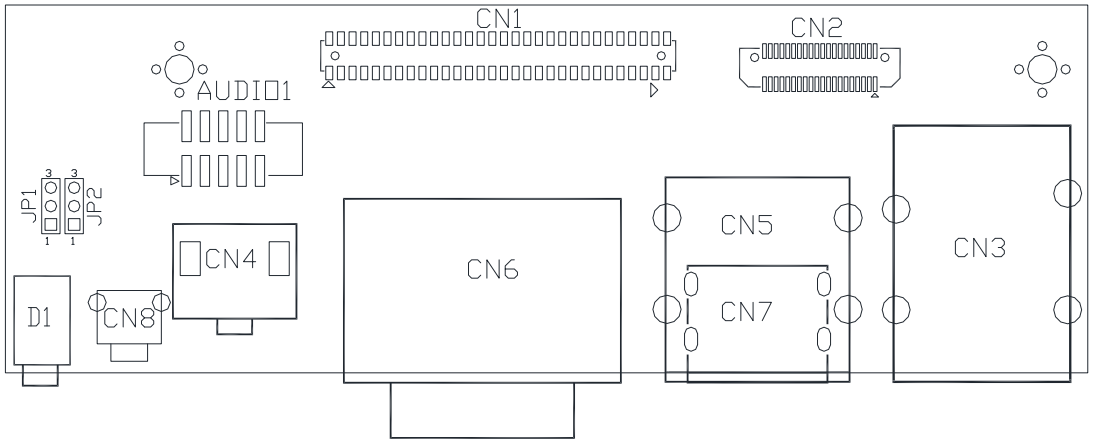


Bottom View

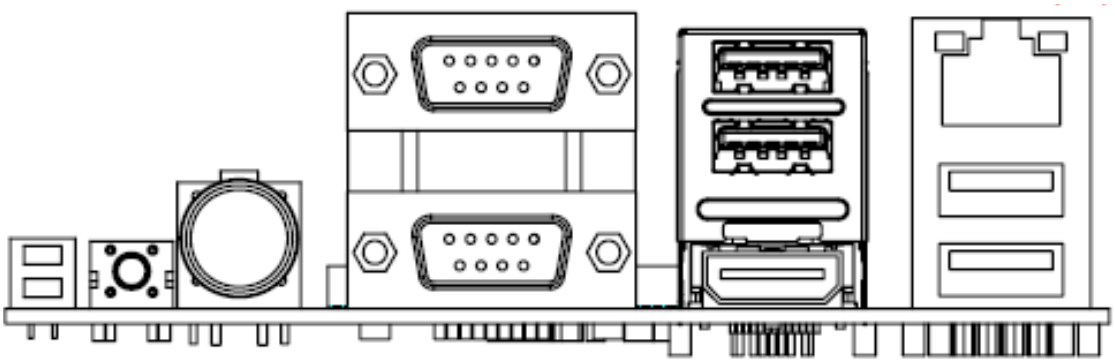


Side View

A.3 AX93278 Board Layout



Top View



Side View

A.4 AX93278 Assembly Drawing

Installing Heatspreader and I/O Boards

Gently connect AX93278 and AX93267 I/O boards to PICO121. Align assembly holes and firmly secure the heatspreader plate and I/O boards to the PICO121, see image below. Be careful not to over-tighten the screws. See chapter 4 for details of AX93267 I/O board.

x4

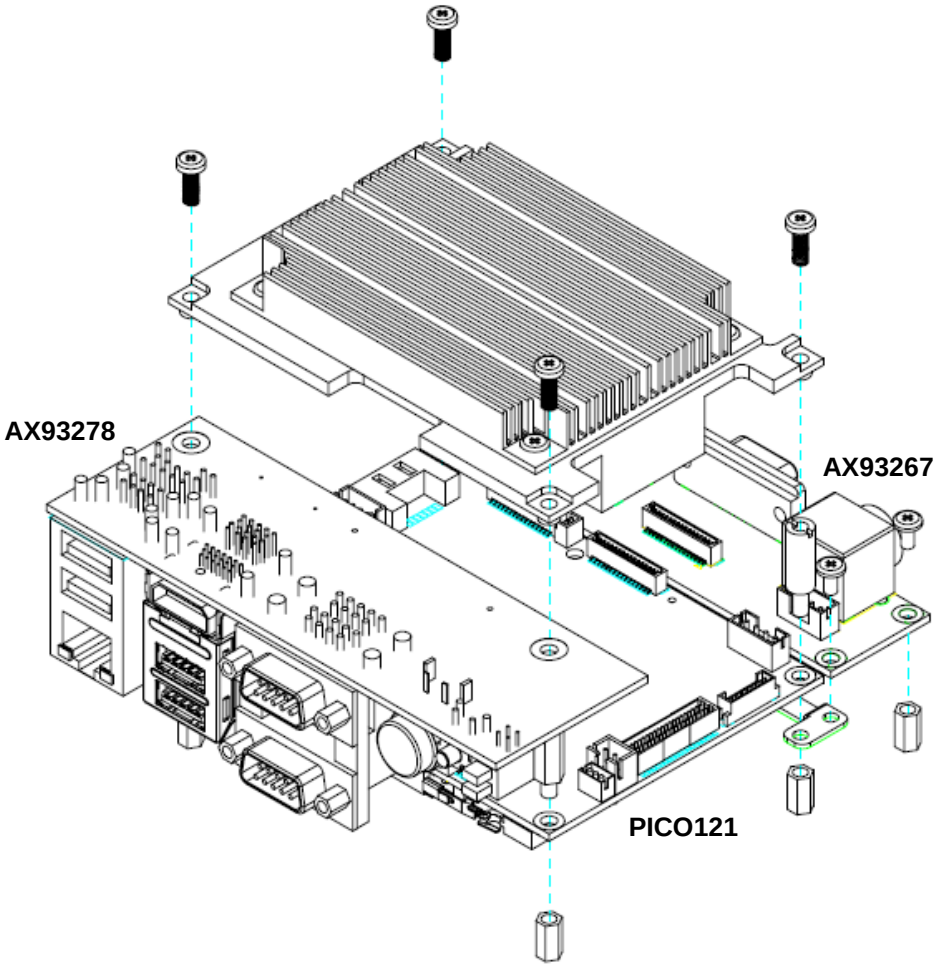
x2

x2

x4 (8mm)

x2 (7mm)

x4



A.5 AX93278 Jumper Settings

Properly configure jumper settings on the AX93278 I/O board to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note

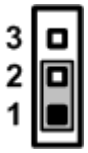
Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP1	COM1 Data/+12V Power Selection Default: RS-232 Data	CN6 Pin 18: RI	1-2 Close
JP2	COM1 Data/+5V Power Selection Default: RS-232 Data	CN6 Pin 10: DCD	1-2 Close

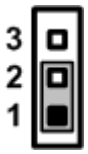
A.5.1 COM1 Data/Power Selection (JP1 and JP2)

The COM1 port has +12V level power capability on RI and +5V level on DCD by setting JP1 and JP2, respectively. When this port is set to +12V or +5V level, please make sure its communication mode is RS-232 (see BIOS setting in section 6.4).

Function	JP1 Setting
Data: Set CN6 pin 18 to RI (Default)	1-2 close
Power: Set CN6 pin 18 to +12V level	2-3 close



Function	JP2 Setting
Data: Set CN6 pin 10 to DCD (Default)	1-2 close
Power: Set CN6 pin 10 to +5V level	2-3 close



A.6 AX93278 Connectors, Switches and LED

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows connectors, switches and LED on the hardware.

Connector	Description
CN1	Low Speed Board to Board Connector
CN2	High Speed Board to Board Connector
CN3	Ethernet and USB 2.0 Connector
CN4	System Power Switch
CN5	USB 3.0 Connector
CN6	COM Connector
CN7	HDMI Connector
CN8	System Reset Switch
AUDIO1	Audio Connector
D1	Power and HDD LED Indicator

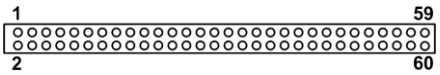
A.6.1 High and Low Speed Board to Board Connectors (CN2 and CN1)

CN2 is a 2x20-pin high speed board to board connector. Its pin assignments are given as follows.

Pin	Signal	Pin	Signal
1	USB3_TX0_DP	2	DP0_HPD
3	USB3_TX0_DN	4	DP0_AUX_P
5	GND	6	DP0_AUX_N
7	USB3_RX0_DP	8	GND
9	USB3_RX0_DN	10	DP0_TX3_P
11	GND	12	DP0_TX3_N
13	USB3_TX1_DP	14	GND
15	USB3_TX1_DN	16	DP0_TX2_P
17	GND	18	DP0_TX2_N
19	USB3_RX1_DP	20	+5V
21	USB3_RX1_DN	22	DP0_TX1_P
23	GND	24	DP0_TX1_N
25	N/A	26	GND
27	PCIE_TXP2	28	DP0_TX0_P
29	PCIE_TXN2	30	DP0_TX0_N
31	GND	32	GND
33	PCIE_RXP2	34	PCIE_LAN1_CLK_P
35	PCIE_RXN2	36	PCIE_LAN1_CLK_N
37	GND	38	GND
39	PCIE_RST#	40	PCIE_WAKE_UP#

CN1 is a 2x30-pin low speed board to board connector. Its pin assignments are given as follows.

Pin	Signal	Pin	Signal
1	MIC_IN	2	LINE_O_L
3	LINE_IN_L	4	LINE_O_R
5	LINE_IN_R	6	AUDIO_GND
7	AUDIO_GND	8	+5V
9	COMGND	10	+5V
11	DCD1	12	DSR1
13	RXD1	14	RTS1
15	TXD1	16	CTS1
17	DTR1	18	RI1
19	COMGND	20	+5V
21	DCD2	22	DSR2
23	RXD2	24	RTS2
25	TXD2	26	CTS2
27	DTR2	28	RI2
29	GND	30	GND
31	USB_PWR0	32	USB_PWR0
33	C_USB_PN6	34	C_USB_PN7
35	C_USB_PP6	36	C_USB_PP7
37	USB0_GND	38	USB0_GND
39	USB_PWR1	40	USB_PWR1
41	C_USB_PN8	42	C_USB_PN9
43	C_USB_PP8	44	C_USB_PP9
45	USB1_GND	46	USB1_GND
47	+3.3V	48	GND
49	+3.3V	50	GND
51	+3.3V_DUAL	52	FP_PSIN_N
53	+3.3V_DUAL	54	GND
55	HW_RESET_N	56	+5V
57	HDD_ACT#	58	+12V
59	GND	60	+12V



Note

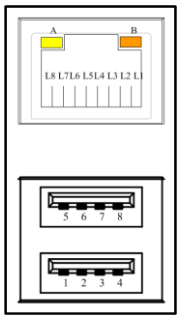
Please gently insert CN2 and CN1 into CN4 and CN5 on PICO121.

A.6.2 Ethernet and USB 2.0 Connector (CN3)

This board has one RJ-45 connector. Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

The lower Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connector on the rear I/O are for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
L1	MDI0+	L5	MDI2-
L2	MDI0-	L6	MDI1-
L3	MDI1+	L7	MDI3+
L4	MDI2+	L8	MDI3-
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		

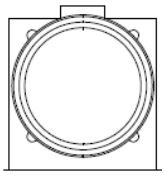


Pin	Signal	Pin	Signal
1	+5V	5	+5V
2	USB1_DATA-	6	USB2_DATA-
3	USB1_DATA+	7	USB2_DATA+
4	GND	8	GND

A.6.3 System Power Switch (CN4)

This switch is for turning on/off the system power.

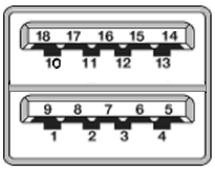
Function	Description
On	Turn on/off system
Off	Keep system status



A.6.4 USB 3.0 Connector (CN5)

The board comes with a Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) connector on the rear I/O for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB_Data0-	11	USB_Data1-
3	USB_Data0+	12	USB_Data1+
4	GND	13	GND
5	SSRX0-	14	SSRX1-
6	SSRX0+	15	SSRX1+
7	GND	16	GND
8	SSTX0-	17	SSTX1-
9	SSTX0+	18	SSTX1+

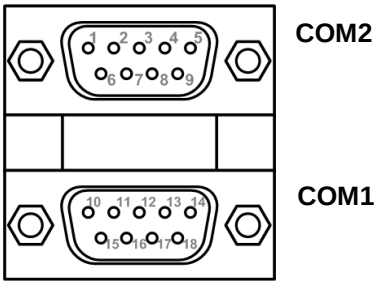


A.6.5 COM Connector (CN6)

CN6 is a double-deck DB-9 connector for COM1 (lower) and COM2 (upper). COM1 comes with power capability on DCD and RI pins by setting jumpers (see section A.5.1). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to BIOS setting in section 6.4.

COM1:

Pin	RS-232	RS-422	RS-485
10	DCD	TX-	Data-
11	RXD	TX+	Data+
12	TXD	RX+	N.C
13	DTR	RX-	N.C.
14	GND	No use	No use
15	DSR	No use	No use
16	RTS	No use	No use
17	CTS	No use	No use
18	RI	No use	No use



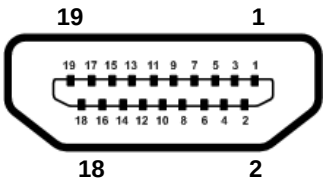
COM2:

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

A.6.6 HDMI Connector (CN7)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable. Its interface is available through connector CN7.

Pin	Signal	Pin	Signal
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	CEC	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		



A.6.7 System Reset Switch (CN8)

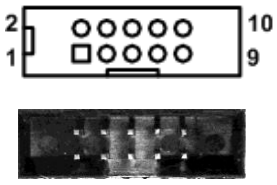
This switch reboots your computer without turning off the power supply. It is a better way to reboot your system for a longer life of the system power supply.

Function	Description
On	Reset system
Off	Keep system status

A.6.8 Audio Connector (AUDIO1)

This is a 2x5-pin box header for audio interface. Install audio driver, and then attach audio devices to AUDIO1.

Pin	Signal	Pin	Signal
1	MIC_IN	2	GND
3	NC	4	GND
5	NC	6	GND
7	AUDIO_OUT_L	8	GND
9	AUDIO_OUT_R	10	GND

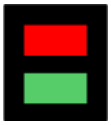


A.6.9 Power and HDD LED Indicator (D1)

The red LED is linked to Hard Disk Drive (HDD) activity signal. LED flashes every time HDD is accessed.

The green power LED lights up and will remain steady while the system is powered on.

LED Color	Description
Red	Hard disk drive activity
Green	Power on/off



Appendix B
Watchdog Timer

B.1 About Watchdog Timer

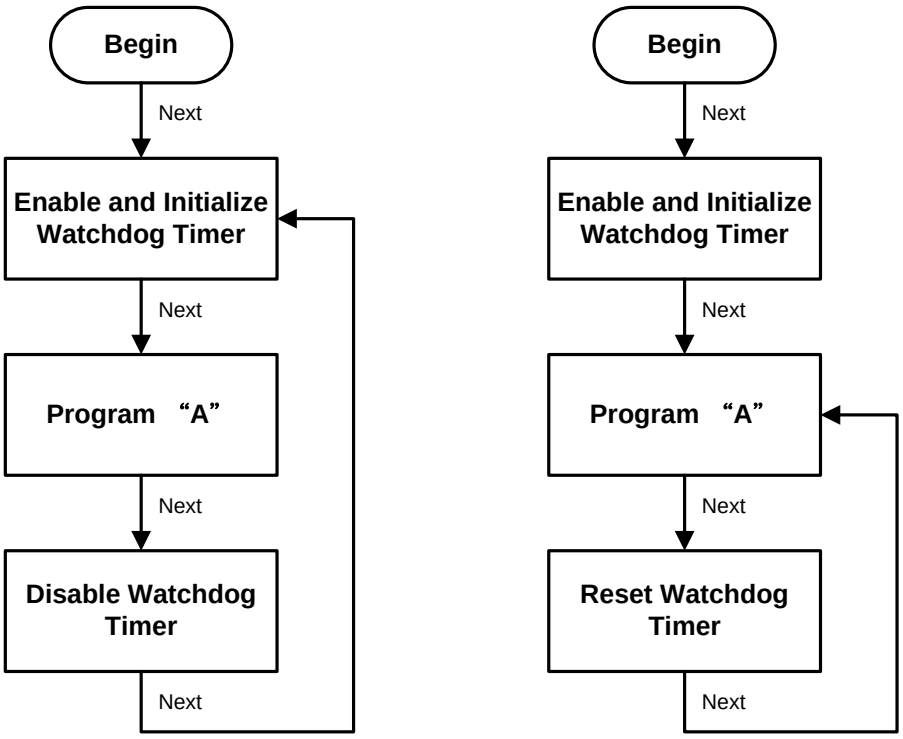
Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

B.2 How to Use Watchdog Timer

The I/O port base addresses of watchdog timer are 2E (hex) and 2F (hex). The 2E (hex) and 2F (hex) are address and data port respectively.

Assume that program A is put in a loop that must execute at least once every 10ms. Initialize watchdog timer with a value bigger than 10ms. If the software has no problems; watchdog timer will never expire because software will always restart the counter before it reaches zero.



B.3 Sample Program

Assembly sample code :

```
;Enable WDT:
mov     dx,2Eh
mov     al,87            ;Un-lock super I/O
out     dx,al
out     dx,al

;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,08h
out     dx,al

;Activate WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Set Second or Minute :
mov     dx,2Eh
mov     al,0F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh            ;N=00h or 08h(see below Note)
out     dx,al

;Set base timer :
mov     dx,2Eh
mov     al,0F6h
out     dx,al
mov     dx,2Fh
mov     al,Mh            ;M=00h,01h,...FFh (hex),Value=0 to 255
out     dx,al            ;(see below Note)

;Disable WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,00h           ;Can be disabled at any time
out     dx,al
```

***Note**:*
*If **N**=00h, the time base is set to second.*
***M** = time value*
00: Time-out Disable
01: Time-out occurs after 1 second
02: Time-out occurs after 2 seconds
03: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

*If **N**=08h, the time base is set to minute.*
***M** = time value*
00: Time-out Disable
01: Time-out occurs after 1 minute
02: Time-out occurs after 2 minutes
03: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes